Kickbacks, Gifts, Sex For Jobs

By Bob Johnson
CW New York Bureau

NEW YORK — Kickbacks, gifts and even sexual favors are among the enticements that some unscrupulous employment agencies here are reportedly using to place DP professionals.

Agencies receive fees from the employer — sometimes equal to as much as one-third of a newly placed DPer's annual salary — after the employee has been working for 90 days. According to both recruiters and job applicants interviewed recently, some agencies attempt to convince an applicant to take a job in exchange for a kickback payable at the end of the 90 days.

At that time, if he doesn't like the job, the DPer can quit — and the cycle is repeated.

The result is that good agencies that perform a useful service for job seekers are being hurt by the unprincipled ones, the president of one midtown agency complained. Moreover, the schedules of DP shops that have come to depend on the new employee are severely disrupted.

Besides the kickbacks, promises of somewhat less valuable gifts, such as television sets and stereos, are also made, sources said. Sometimes the agencies don't deliver on their gift promises, and other times they send the recipient a year-end tax statement for the "gift," the sources added.

Another agency ploy is to advertise nonexistent, high-paying positions for systems programmers or analysts requiring only one or two years' experience. While these misleading ads create a market that really does not exist, as one recruiter complained, they produce a lot of resumes for those who run them.

At the same time, however, they create dissatisfaction among programmer trainees who feel their companies are underpaying them.

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COMPUTERWORLD
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NEWSPAPER

Happy New Year?

By Brad Schultz
CW Staff

Software that runs under the rubric of IBM's Virtual Telecommunications Access Method (Vtam) solves complicated problems in getting a lot of data through large user networks around the world.

But Vtam forgot that 1980 was a leap year, according to a user spokesman who requested anonymity, and that user's 400-terminal network based on a 6M-byte 370/168 and 8M-byte 3032 did not run for part of New Year's Eve as a result.

Since the network plays a vital role in supporting emergency assistance to many people, the crash of Vtam Level 1.0 in this instance was not a pleasant way to ring out the year. Finding its three 3705 communications controllers dead and an INVALID DATE error message flashing on a systems monitor, the user soon deduced the problem: The Vtam in question did not recognize a 366-day year.

The occurrence of a 29th day in February 1980 made the final day of December No. 80366 on the Julian Calendar featured by this user's installation (the first two digits, "80," indicate the year and the final three digits specify a day of that year).

According to the spokesman, the 3705s under Vtam 1.0 choked on 80366 and, for two hours, froze the processing of data and forms critical to treatment of people with problems that made their holiday season catastrophic. In the final hours of 1980, systems specialists at the facility determined that the source of trouble was a faulty "fix" among many fixes used in preventive maintenance for their particular Vtam implementation.

(Continued on Page 8)

IBM Hikes Lease, Rental Prices To Stimulate User Buying Interest

By Tom Henkel
CW Staff

ARMONK, N.Y. — IBM apparently plans to raise lease and rental prices on its major processors every six months in efforts to encourage users into buying hardware. The firm just announced another round of 7% to 8% lease and rental increases along with up to 15% increases in software and maintenance services. The late December increase follows similar price increases in June 1980 and December 1979.

The latest announcement hikes prices on Data Processing Division (DPD) products by 7%, General Systems Division (GSD) products by 8% and major Office Products Division hardware by 8%.

DPD and GSD also increased monthly maintenance prices up to 15% and hourly maintenance by 10%. DPD increased the cost of educational courses by 10% and GSD increased its courses by 15%, IBM said.

Industry analysts, while not surprised by the IBM announcement, predict the move will set off a rash of price increases throughout the industry. Some vendors, including Digital Equipment Corp. and Memorex Corp. (see related story on Page 2), have already announced price increases.

As in previous announcements, IBM exempted new products, those facing heavy competition and those not faring well from the increases. Exempted from purchase, lease and rent increases were IBM's newly announced 3081 and 3033S processors. Peripherals exempted from these increases were the 5222 printer, the 3420 tape drive, the 3211 system printer and the 5256 printer, IBM said.

IBM is also continuing to push users to purchase, rather than to lease or rent, hardware. Exempted from only purchase price increases were DPD's

(Continued on Page 4)

Three HP Software Products Fit 3000s Into IBM Nets

PALO ALTO, Calif. — Hewlett-Packard Co. has announced three software products that fit HP 3000 computer systems to networks hosted by IBM mainframes.

The packages employ HP's Intelligent Network Processor (INP) for reduced dependence on host resources and make the vendor's HP 3000 Series 30, 33, 44 and III systems alternatives to IBM terminals and remote job entry (RJE) stations.

Two of the packages allow those HP 3000s to communicate with IBM hosts in different ways. The HP Interactive Mainframe Link (IML) software makes the systems emulate IBM 3270 terminals for interactive communications in distributed processing networks.

A second package, a new version of the HP 3000 Multileaving RJE software, gives HP 3000 Series 30, 33, 44 and III systems the functions of a remote IBM Hasp or JES/2 or JES/3 multileaving batch workstation. This package is said to execute the entire multileaving IBM bisynchronous line protocol on the INP controller rather than within the HP 3000 system.

Finally, the Multipoint Terminal Support (MTS) package establishes terminal communication between all HP 3000 computer models and the HP 264X and HP 262X display station as well as the 307X data capture termi-

(Continued on Page 6)

Computer Staff Union OK's Boeing's 34% Pay Hike Plan

By Jeffry Beeler
CW West Coast Bureau

SEATTLE — A labor union representing much of the Boeing Co.'s computing staff last week OK'd a proposal for a new three-year employment contract and in so doing narrowly averted a threatened Jan. 7 strike.

By an undisclosed margin, the 14,000 members of the Seattle Professional Engineering Employees Association (Speea) voted to accept a Boeing-proposed pay hike totaling 34% during the next three years.

Last week's vote abruptly ended a potentially costly internal labor dispute that nearly forced an estimated half to two-thirds of Boeing's programmers and systems analysts here to walk off their jobs.

As is usually the case in labor-contract squabbles, the Boeing dispute's main point of contention was money. Management's original contract offer called for a salary hike totaling 34%, but Speea sought a 45% increase instead, ostensibly to maintain pay-scale parity with one of the firm's other unions.

The 11% gap between the two sides' bargaining positions proved a major

(Continued on Page 5)

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Others Expected to Follow Suit

DEC, Memorex, Xerox Raise Prices

Although barely two weeks into the new year, already three companies have announced product price increases to combat an old acquaintance not soon forgotten — inflation. And more vendors are expected to follow suit.

Fortunately, most users have written possible vendor price jumps into their new-year budgets, increasing them an average of 12% from last year's figures, according to a recent *Computerworld* survey [CW, Dec. 29].

Just a few days before 1980 faded into history, Digital Equipment Corp. announced price increases averaging 4% to 6% on most of its packaged computer systems, peripherals, software products and services. Effective immediately, the price hikes affect every one of DEC's products, except the 32-bit VAX-11/780 and recently debuted VAX-11/750 and at least one member of its Decsystem family, the Model 2020.

In addition, prices for some of the firm's older products now being manufactured in lower volumes, such as the PDP-11/03 introduced in 1975, were increased up to 13% to reflect their higher production costs.

Typical system price increases include 5% for a 1M-byte PDP-11/70 that now costs about $183,700, up from $174,300; 10% for a PDP-11/44 with 256K bytes of memory, raising its cost from $70,400 to $77,200; and 5% for a PDP-11/34, which now costs $39,300, up from $37,400. Prices for the company's printers and terminals were also raised from 5% to 10%.

This latest increase marks the second time in a year that DEC has raised its product prices to fight inflationary pressures that have driven up the costs of labor and materials. Last spring, the firm increased packaged system prices by 5%, hardware costs by 7% and software costs by up to 15%.

Hours after New Year's revelers retired their party hats and noise makers for another season, Memorex Corp. released price increases of 7% to 10% on its end-user disk and tape subsystems. Effective immediately, lease and rental prices on the firm's disk subsystems were raised an average of 7%, or as provided in the terms and conditions of the customer's lease agreement, a spokesman said.

Maintenance prices on Memorex tape subsystems will be increased 10% effective April 1, while the lease and rental prices on these products will remain the same.

In addition, the California-based firm raised the hourly per-call service rates for all of its Storage Systems Group products by 10%. This change is effective immediately, the spokesman noted.

Finally, Xerox Corp. welcomed the new year and its inflationary kick by announcing that it will raise prices in the U.S. for its Model 9700 intelligent printing system. At the same time, however, the firm released two discount programs geared to cut prices for new customers or users with two or more 9700 systems on site.

The purchase prices of the 9700 system will be increased approximately 4% while leasing prices will rise about 6%, a spokesman said. In addition, the 9700's maintenance charges will be hiked an average of 14%.

One of the firm's discount lease plans on the 9700 was designed for customers with two-year contracts, who have two or more 9700 units installed and run a total of at least one million printed pages per month, the spokesman added. Discounts for these customers will range from 5% to 12.5% depending on the number of 9700 systems at the user's location.

The second leasing plan includes a graduated discount of up to $10,500 as a start-up allowance for new 9700 customers signing six- or 12-month contracts with no page minimum.

The current purchase price of the 9700 printing system, which operates from magnetic tape or directly from the computer, is about $375,000. The new prices go into effect April 1 or at the end of contract for present users.

'Computerworld' Opens N.Y. Bureau

NEW YORK — *Computerworld* has formally opened an editorial bureau here. The news office is located at Suite 7G, 401 E. 80th St., New York, N.Y. 10028.

The phone number is (212) 570-2135.

New York news announcements may be addressed to correspondent Robert Johnson. All other news and all advertising inquiries should continue to be directed to CW's Framingham, Mass. office.

Correction

In a recent article, "IBM After H," Advanced Computer Techniques Corp. President and Chairman Charlie Lecht was incorrectly quoted as saying Westinghouse Electric Co. was going into the time-sharing computing business. Lecht actually said General Electric Co. was returning to the time-sharing business.

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1965 FIRST to market a software product nationally.

1965 FIRST to build an automatic flow charting software product

1967 FIRST to market software products internationally.

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IBM Hikes Lease, Rental Prices to Boost Sales

(Continued from Page 1)

30 Series, the 4300 and 8100 lines of processors. GSD's System/34, System/38 and Series/1 processors were also exempted.

Yankee Group analyst Gerard Hallaren said the GSD products, which are generally purchased by smaller businesses, may have been spared purchase price increases to keep those processors competitive in the crowded minicomputer marketplace.

IBM's intent in the upper end of the DPD offerings is clear: it wants to convert as many leased 3033 CPUs to purchase before residual values for those processors drop with first deliveries of the 3081 in the first quarter of 1982. Gartner Group analyst Dave Stein said IBM does not want to get stuck with leased 3033 processors when the market finally drops out; therefore, IBM has been trying to lure its 3033 customers to purchase CPUs for the past year with consistent rent and lease hikes and a declining purchase price.

IBM is apparently pleased with the pricing levels of its 4300 and 8100 lines. While it had been steadily raising rent, lease and purchase prices on those processors in the past three price increases, only the rent and lease prices were increased Dec. 29. The move could mean the 4300 and 8100 processors, too, are nearing the end of their life spans as main IBM products. However, it could also mean IBM has finally raised the price of the two processors, which many felt were priced too low, to an acceptable level, according to the Yankee Group's Hallaren.

Aside from a software pricing inconsistency, the Dec. 29 increase (see related story on Page 5) continues a trend started back in November 1979 when IBM announced the 3033N processor. At that time IBM started its emphasis on purchase by cutting the purchase price of the 3031 and 3032 processors by 20% and the 3033 by 15%. IBM also cut main memory for those systems by 30% [CW, Nov. 5, 1979].

In December 1979, IBM announced 5% to 20% increases on virtually all its hardware, software and maintenance services. IBM's 30 series was exempted from purchase price increases and DPD's newly announced 3279 color graphics terminal, the 3101 teletype-compatible hardware and the 3845 and 3848 cryptographic equipment were exempted from rent, lease or purchase increases [CW, Jan. 14, 1980]. GSD's System/38, Series/1 and 5220 administrative systems were also not increased. Those GSD increases came on the heels of a December 1979 33% price cut on the Series/1 4955, System/3 (models 8, 12 and 15), System/32 and System/34.

In late June 1980, IBM again increased its prices 5% to 10% on lease, rental and maintenance increases on all major systems except the then newly announced 4331 Model Group 2, and System/38. GSD's 5120 desktop computers were spared from the increase — mainly because they are virtually a purchase-only item [CW, July 7].

On Nov. 12, IBM announced the 3081 and 3033S processors and cut the price of 30 series processors by 15% to 22% and lowered the cost of main memory on 30 series processors to as low as $35,000 per 1M byte.

IBM SYSTEM[1] / PRICE CHANGES		3033N, 4M Bytes	3033U4 (Uniprocessor), 4M Bytes	3033A8 (Memory Half of Attached Processor), 8M Bytes	3042 (Nonmemory Half of AP)	4341-K1, 2M Bytes	8140-A74, 1M Byte
November 1979 (3033N Announcement)	Lease	$47,930 (4-Year)	$66,830 (4-Year)	$78,260 (4-Year)	$37,600 (4-Year)	$5,975 (2-Year)	$1,790 (2-Year)
	Rent	$52,723	$73,513	$86,062	$41,360	$7,021	$2,103
	Purchase	$1,550,000	$2,620,000	$2,830,500	$895,500	$245,000	$63,020
	Ratio[2]	29.3	35.63	32.8	21.6	34.8	29.9
December 1979 (Routine Price Increase)	Lease	$51,280 (4-Year)	$71,500 (4-Year)	$83,710 (4-Year)	$40,230 (4-Year)	$6,390 (2-Year)	$1,910 (2-Year)
	Rent	$56,708	$78,650	$92,060	$44,253	$7,508	$2,244
	Purchase	No Change	No Change	No Change	No Change	$257,250	$66,150
	Ratio	27.3	33.3	30.7	20.2	34.2	29.4
June 1980 (Routine Price Increase	Lease	$53,840 (4-Year)	$75,070 (4-Year)	$87,860 (4-Year)	$42,240 (4-Year)	$6,707 (2-Year)	$1,990 (2-Year)
	Rent	$59,224	$82,577	$96,646	$46,464	$7,878	$2,337
	Purchase	No Change	No Change	No Change	$805,000	No Change	$69,420
	Ratio	26.1	31.72	29.28	17.3	32.6	29.7
November 1980 (3081, 3033 Announcement)	Lease	No Change	No Change	No Change	No Change	No Change	No Change
	Rent	No Change	No Change	No Change	No Change	No Change	No Change
	Purchase	No Change	$2,225,000 (15.1% Decrease)	$2,375,000 (16.1% Decrease)	No Change	No Change	No Change
	Ratio	No Change	26.9	24.5	No Change	No Change	No Change
December 1980 (Routine Price Increase)	Lease	$57,600 (4-Year)	$80,320 (4-Year)	$93,120 (4-Year)	$45,190 (4-Year)	$7,170 (2-Year)	$2,120 (2-Year)
	Rent	$63,360	$88,352	$102,432	$49,709	$8,424	$2,491
	Purchase	No Change	No Change	No Change	No Change	No Change	No Change
	Ratio	24.4	25.1	23.1	16.1	30.5	27.8

[1] Prices listed are for the processor only. Console and other necessary hardware is not included.

[2] Purchase: Rent Ratio.

CW Chart, Pricing Information Courtesy Gartner Group

IBM Watcher Sees About-Face In IBM Pricing

By Tom Henkel
CW Staff

GREENWICH, Conn. — While IBM contends its Dec. 29 price increases came as part of a normal business review, one IBM watcher here says the announcement marks a rapid turnaround in IBM's software pricing policy.

Bob Fertig, president of Advanced Computer Techniques Corp.'s Technology Analysis Group, said IBM wiped out a software price cut made only seven weeks earlier with the Dec. 29 announcement.

On Nov. 12, when IBM announced its 3081 processor, it also announced a new release of the MVS/SP operating system. At the same time, IBM unbundled much of its 370-era software by announcing that maintenance on most program products would be priced separately. IBM cut the price of the program products by the amount of the added maintenance charge. Hence, users would not be paying more for the unbundled software (see related chart).

Those changes were to go into effect Jan. 1, 1982 with volume shipments of MVS/SP Release 3 and volume shipments of the 3081. With the Dec. 29 announcement, IBM raised the price of the program products it cut seven weeks earlier. The Dec. 29 increase impacted not only the price of the unbundled software, effective Jan. 1, 1982, but it also raised the interim bundled price effective 90 days after the Dec. 29 increase.

Noting that IBM is not usually that inconsistent with its pricing, Fertig said someone made a mistake. Either the pricing information IBM released Nov. 12 was wrong, or IBM top brass had a change of heart and decided cutting the cost of its program products wasn't such a good idea. In any case, IBM announced a price cut Nov. 12 that was wiped out before it ever went into effect, Fertig said.

PRICE CHANGES / PROGRAM PRODUCT	Bundled Software Charges in Effect Until 1/82		Unbundled Price as of Nov. 12 Announcement Effective 1/82		Unbundled Price as of Dec. 29 Announcement Effective 1/82		Total User Impact (1/82) (Price & Maintenance)	
	Bundled Price as of Nov. 12 Announcement	Bundled Price After Dec. 29 Increase	Monthly Charge	Monthly Support Charge	Monthly Charge	Monthly Support Charge	Monthly Charge	Net Increase
TSO Cobol Prompter	$35	$39	$30	$5	$33	$5	$38	$3
Fortran IV-3	81	89	73	8	80	8	88	7
Fortran IV-H	330	363	316	14	347	14	361	31
CICS/OS/Z5	1,100	1,210	984	116	1,082	116	1,198	198
IMS/Z5	1,045	1,145	905	140	995	140	1,135	90
IMS Data Communications[1]	1,265	1,390	1,125	140	1,235	140	1,375	110
IMS Fast Path Feature[1]	1,375	1,510	1,210	165	1,330	165	1,495	209

[1] Component of IMS

CW Chart, Information Courtesy Advanced Computer Techniques Corp., Technology Analysis Group

Boeing Union OK's Pay Hike

(Continued from Page 1)

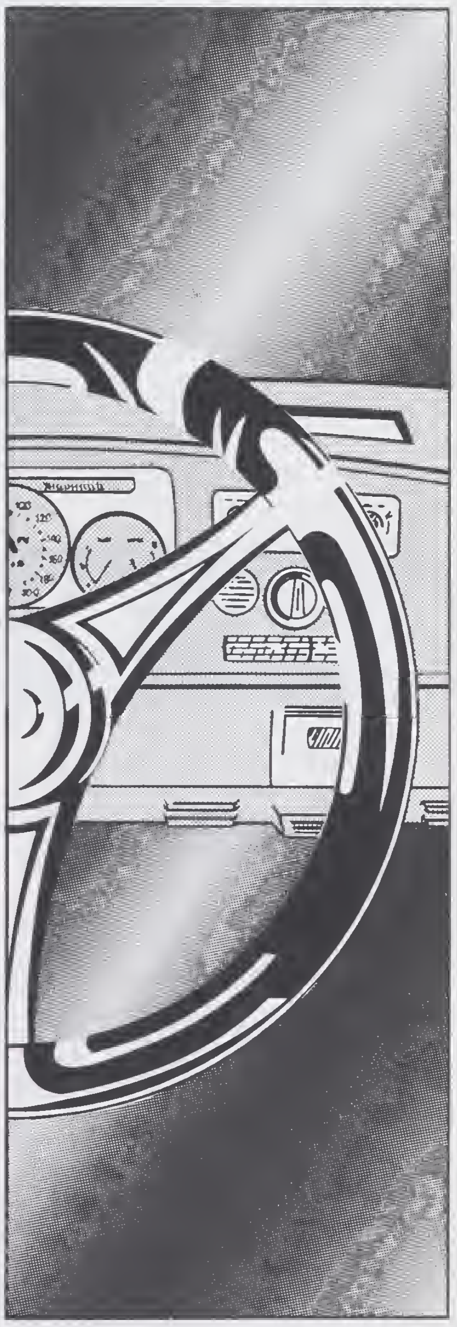
stumbling block, and efforts to negotiate a compromise eventually ended in failure.

In response, Speea scheduled a Jan. 6 election to vote on Boeing's contract proposal and threatened to call a strike the next day if the company's pay-raise offer was rejected.

In the end, however, management's contract proposal won the Speea rank and file's approval, and Boeing was thus able to avoid what otherwise would have proved the first strike in history to halt engineering and computing operations in the firm's main office.

Although Speea is composed primarily of professional engineers, its control also extends to two classes of computing personnel: programmers and systems analsyts.

Roughly 50% to 67% of Boeing's total analyst and programmer staff currently boosts Speea membership, according to one of the firm's software engineers, Robert Glass.



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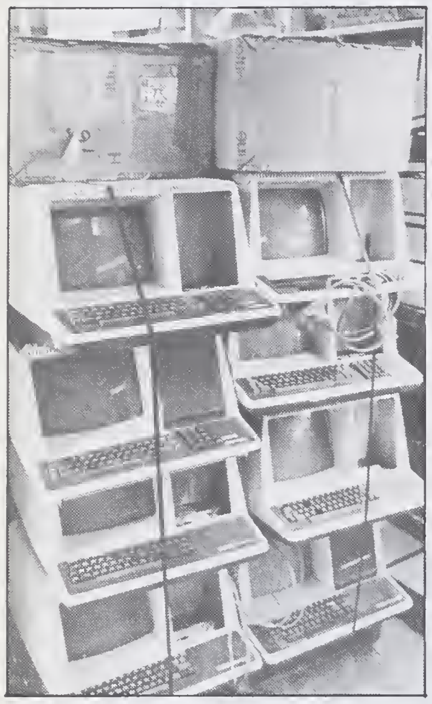
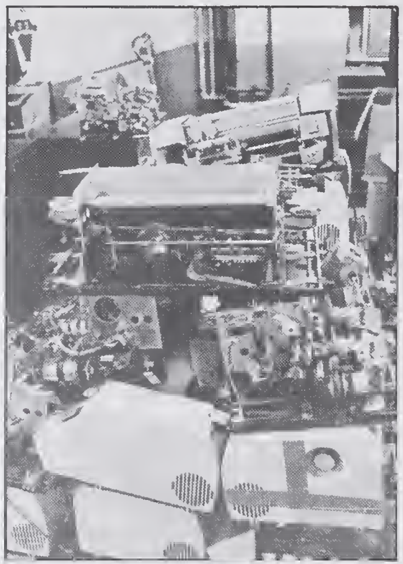
American Used Computer Trashes Its 'Own Children'

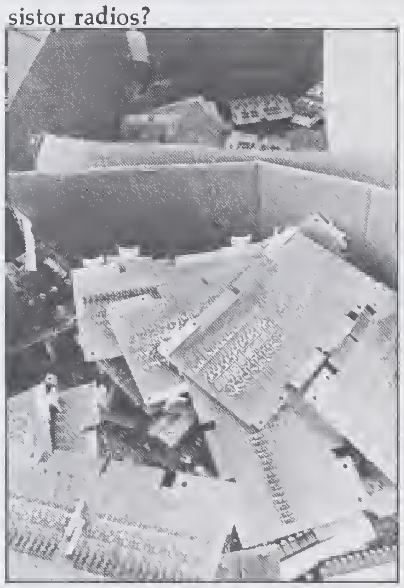
BOSTON — Almost anything can turn up in the trash these days. Last week American Used Computer Corp. junked 642 obsolete or unwanted pieces of computer equipment. Originally worth more than $6 million, the out-of-date technology is being sold for up to 25 cents a pound — probable destination Taiwan. Trashing the equipment — some of which had been at the warehouse for up to eight years — was like "selling your own children" for owners Bill Grinker and Sonny Monosson.



Digital Equipment Corp. VT 50s Tied Up for the Trash



Will these be reincarnated as transistor radios?



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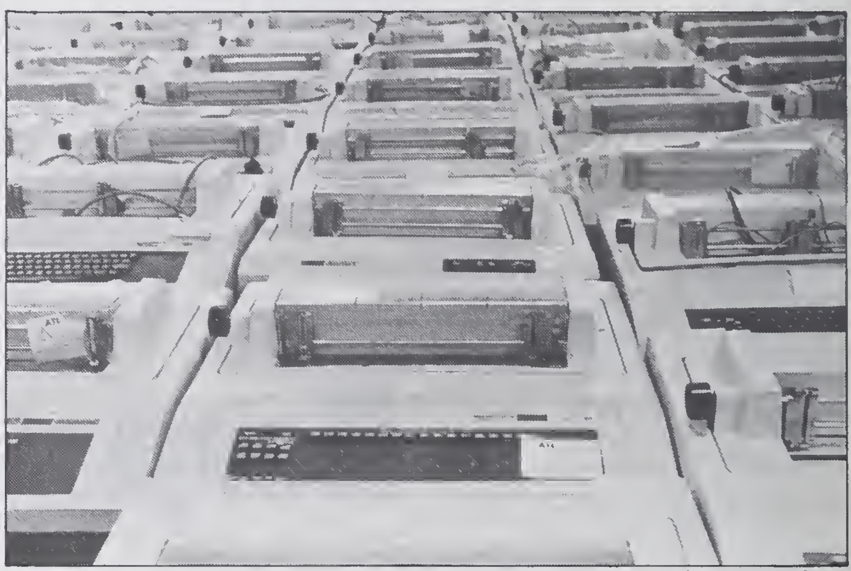

Decwriter Models II and III Taking Over CW Photos by A. Dooley

Three HP Software Products Fit 3000s Into IBM Nets

(Continued from Page 1)

nals.

IBM-based data communications users can slip HP 3000s with the IML package into their midst without altering present libraries of mainframe applications under IBM's CICS, IMS, Vtam, Tcam and Btam facilities. The net software product permits applications written on HP 3000s in HP's Cobol, Cobol II, Basic, Fortran and SPL to have on-line access to IBM hosts through procedures available on the HP 3000s, a spokesman explained.

This is done by emulation of "nearly all the functions" of IBM 3271, 3274 and 3276 remote cluster controller units under the bisynchronous protocol as well as the bisynchronous versions of IBM's 3277 and 3278 CRT terminals and the 328X printers, the spokesman said.

Although the main idea behind IML is to put a link between IBM host applications and HP 3000 applications, the package also offers a so-called Inquiry and Development Facility IML/-IDF to admit direct communications between local or remote HP terminals and the IBM host.

The feature also allows the host to remotely utilize printers attached to an HP 3000.

With IML/IDF, users can enter a system command that links an HP 3000-attached terminal to one of 32 available IML paths multiplexed over the single communications channel to the host, the spokesman stated. "After entry of this IML command," he said, "all further interaction is directly between the IBM mainframe and the user terminal, just as with the standard IBM 3270 device."

As for the second network product, the revised Multileaving RJE software, users can reportedly pass data between HP 3000s and IBM systems under ASP, Hasp, JES2 or JES3 at up to 9,600 bit/sec. The package also provides a job submission and output management facility not found in usual implementations of the older Multileaving RJE version, the spokesman added.

HP's MTS package, the third product, was described as enhancing terminal communications capabilities of HP 3000s by allowing multiple remote or locally attached terminals to share a single communications line; cutting costs by sharing resources such as modems and lines; and providing automatic error checking and retransmission of faulty data.

Cost Reductions

With MTS, the INP runs as a front-end processor to the user's HP 3000, freeing that system to do tasks it otherwise could not handle, the spokesman noted.

The multipoint communication rendered by MTS is intended to grant users significant reductions in monthly communications costs by accepting a number of terminals on a single line. Also, the package improves data integrity, the spokesman claimed, due to error checking.

Under MTS, a product HP has dubbed the "Data Link" enables many terminals to be connected along the same line at distances up to 2.5 miles from the host mainframe, the spokesman said.

HP's IML, Multileaving RJE and MTS software packages cost $4,200, $2,400 and $1,200 in the U.S. respectively; estimated delivery time is in the range of eight to 12 weeks. The vendor's address is 1501 Page Mill Road, Palo Alto, Calif. 94304.

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References for Sale?

Data Theft Suspected in Credit Profile Misuse

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — A possible data-theft ring based in Southern California is apparently enabling individuals with poor credit ratings to use other people's credit profiles to qualify for loans and open new charge accounts.

The ring's organizers apparently gain possibly unauthorized access to a nearby credit bureau's computerized data base and obtain highly sensitive financial information belonging to people with unblemished credit histories.

They then sell the stolen files to "clients" who have the same first and last names as the individuals to whom the information applies. The recipients, most of whom have earned reputations as bad credit risks, later use the purloined credit references and Social Security numbers on all their loan and charge-account applications, sources claimed.

The suspected scheme thus allows clients with checkered financial histories to masquerade as their fiscally responsible namesakes and to fraudulently receive credit for which they would otherwise probably never qualify.

First Evidence

The first evidence of the ring's possible existence came to light last November during an incident involving a San Diego resident named Wayne Cox, who at the time was applying for a personal loan.

During a routine check of the loan applicant's financial background, investigators found that a copy of one of Cox's credit profiles had somehow fallen into the hands of a different Wayne Cox living in another California city. The profile had apparently been taken from a major credit bureau — TRW, Inc.'s Information Services Division — and had given the other Cox access to the San Diego man's Social Security Number, credit references, date of birth and previous addresses.

Using that personal information, the other Cox had allegedly applied for a loan and opened a department-store charge account without the San Diego man's knowledge or permission.

(The data's alleged recipient could not be reached last week for comment, despite repeated phone calls to his home).

Curious to find out how his supposedly confidential profile had been illegally obtained, the San Diego Cox called his counterpart for an explanation and was told that the information had been furnished by an unidentified Los Angeles resident who, for an undisclosed sum, provides good credit histories to people with questionable financial track records.

Not long after the conversation, the San Diego Cox reported his findings to assorted law-enforcement agencies, including the state Attorney General's office, the local branch of the Federal Bureau of Investigation (FBI) and the police departments in the California cities, where each resides. But despite Cox's efforts to seek as much police help as possible, the mastermind of the suspected data-theft ring has yet to be identified, nor have investigators been able to accurately gauge the operation's scope or determine whether Cox is the caper's only victim.

But of all the case's many unsolved riddles, none perhaps is more perplexing than the question of how Cox's credit profile was obtained from TRW in the first place. Some sources familiar with the incident suspect the information may have been obtained by an unscrupulous TRW employee.

"We certainly can't make any absolute guarantees that the scheme wasn't executed by someone within our own organization," according to TRW's consumer services manager Delia Fernandez. "If an employee had a consumer's name and address and the correct security-access codes, he could have easily pulled the individual's credit report."

On the other hand, Fernandez added, a TRW employee would probably have much more difficulty concealing a possibly unauthorized file access than someone not directly associated with the firm. "Only a handful of our staff is privy to our security-access codes, and every legitimate request for a consumer's credit history is automatically logged and later reviewed for authorization," she explained.

Fernandez's suspicion that Cox's profile could easily have been obtained, possibly illegally, by someone outside TRW is shared by Ed Coughran, computing center director for the local branch of the University of California. "To gain access to a person's credit history, all an outsider would need to do is to get one piece of identifying information slightly better than a name and address," he said. "At TRW and most other credit bureaus, the individual's driver's license number or bank-account number would probably be considered sufficient."

"What has happened to Wayne Cox in San Diego is really a sad, pathetic case," according to local FBI investigator Gary Barnhart. "Here is a guy who has obviously been the victim of a crime, and yet no one seems to know who has jurisdiction over it."

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No Way to Celebrate

Happy New Year? Lear Year Freezes Net

(Continued from Page 1)

These so-called fixes were software programs essentially identical to those already running in conjunction with or as part of the user's Vtam 1.0.

The idea behind them is similar to what often happens when a car mechanic tries to service a vehicle afflicted by unknown diseases with conspicuous symptoms. As the user spokesman put it, a mechanic in such a situation will systematically replace various components — spark plugs, the coil and other parts under the hood — with components known to be working well.

With each replacement in this sequence, the mechanic will reattempt starting the car and attaining an acceptable running condition. In the event a particular parts replacement leads to a satisfactory rumbling of the engine, the mechanic can conclude that the cause of complaint has been excised.

Similarly, users of IBM installations with data communications among mainframes have a practice of regularly running Vtam fixes. As each module of the long Vtam program is tried, certain network performance problems may be eliminated, the spokesman explained.

But what happens if one of the fixes is bad? Apparently that happened at this installation in a major metropolitan area, triggering an INVALID DATE error and the loss of approximately 800 man-hours in labor as employees of the company and its clients waited for resurrection of the 370/168 and 3032.

An IBM service representative was soon on the scene, the spokesman told *Computerworld*, and the byte on which the 3705s gagged — the final '6' in the Julian number 80366 — was changed to something palatable.

Hope for Rebate

Does the user plan any legal action against IBM, reflecting the dollars lost due to the Vtam foul-up? According to the spokesman, the company hopes to receive a rebate from its prime systems supplier, but — to help keep this alternative viable — a vice-president asked him to withhold the company name from print.

Life with IBM can be difficult for customers that publicize problems with the vendor's products, the spokesman said.

However, it will be interesting, he said, to see whether other Vtam users had the same New Year's Eve problem when personnel gather at this year's professional conferences.

Kickbacks, Sex for Jobs

(Continued from Page 1)

Still another ploy purportedly used by some employment agencies is running advertisements for jobs at a specific company's installation. These ads carry a post office box number that seems to belong to the company, but turns out to belong to the employment agency.

People who do not want to deal with agencies are then harrassed by calls, all the time wondering how their names were obtained.

Going hand in hand with money and gifts is the practice of blatantly misrepresenting companies and their DP installations in an attempt to make them appear more desirable. A company's status both in the business community and in professional DP quality will be purposely fabricated by some agencies to hook an applicant into accepting a job, sources claimed.

"I was offered a job as a systems programmer in a company which an agency told me was stable and state-of-the-art; what it didn't tell me was that the company was moving out of state. It was a total waste of my time and the company's," one applicant said of his dealings with recruiters.

The practice of fitting the applicant to the job and not vice versa is also a common complaint among computer personnel. A former Sperry programmer familiar only with Univac equipment revealed that he was treated harshly and unfairly by one New York agency that told him bluntly that he was not worth the salary he was asking because he lacked experience with IBM equipment.

"They tried to convince me to take a job for less money to gain IBM experience, not even considering the talents that I currently possess. It was as though I had a plague," he said.

The programmer eventually landed a good job on his own.

Personnel departments in user companies contribute to the problem by selling copies of incoming resumes to agencies, which then follow up on them, sources said.

Sex Ploys

Some recruiters will even offer high-ranking personnel managers in user companies "good times" with female recruiters of their choice in turn for leads on job openings.

Cut-throat competition between agencies can also blow up in the job seeker's face — when two agencies have the same recruit and the same job opening, for example. A firm beaten by its competitor might provide false information about the applicant regarding police records and job instability to the company's personnel department to ruin the deal.

An agency head here said in one instance a rival firm called a company where he had just made a placement and told the personnal manager that the applicant was previously arrested for rape.

Shady agency deals are not exclusive to the lower DP positions. A second vice-president at the Chase Manhattan Bank also had difficulties, it was learned. A recruiting firm called him at work one day, described a position with a consulting firm and asked if he was interested. The Chase employee went for an interview, but felt the job was not for him.

Some time later, he received a $950 bill from the agency for services rendered. He refused to pay the bill, claiming that he never accepted the job.

The agency then initiated legal action against him. The suit was finally thrown out of court, but it still cost him time and legal fees.

Legitimate agencies are concerned about the practices of unscrupulous agencies and warn applicants to make sure they know with whom they are dealing. A good agency will be up front about the company it is representing and will not try to pressure an applicant into a position that is not suitable, one employment counselor pointed out.

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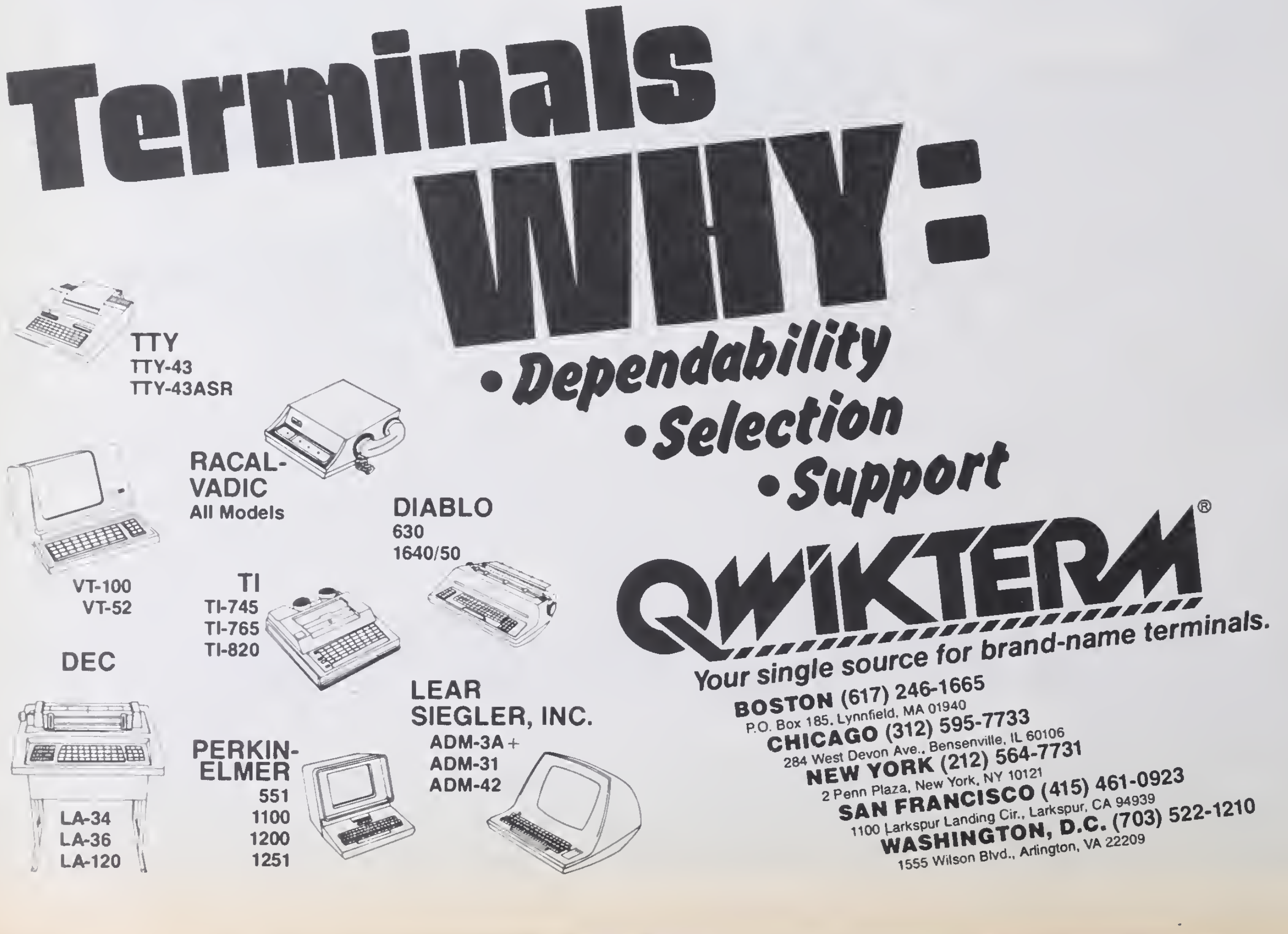

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IBM Adds Seven Models to 3274 TCU Series

By Brad Schultz
CW Staff

WHITE PLAINS, N.Y. — IBM has added seven models to its 3274 series of terminal control units (TCU), describing them as compatible with existing 3274s — which will still be supported — but offering improved performance for the same or less cost.

In the first major expansion of the 3274 family that debuted roughly two years ago, the existing models 1A, 1B 1C and 1D are joined by models 21A, 21B, 21C and 21D and by models 31A, 31C and 31D. All these machines were designed to control a cluster of up to 32 terminals, including display stations and printers, tied to IBM mainframes.

The 3274s store a limited amount of data to track a cluster's performance, and they set the pace at which applications proceed over much of the distance between terminals and host systems. The four 3274-21s have 64K bytes of memory per unit, while each of the three 3274-31s have 128K bytes.

IBM's Data Processing Division also introduced the 3274-51C terminal control unit for clusters of up to only 12 terminals. This runt of the 3274 litter can drive up to eight "Category A" terminals no more than 4,920 ft away and up to four "Category B" terminals within 2,000 ft.

In IBM parlance, Category A includes the 3278 and 3279 CRT terminals as well as certain versions of the 3262, 3287 and 3289 printers. In Category B are the 3277-1 and 3277-2 CRT terminals and certain versions of the 3284, 3286, 3287 and 3288 printers.

Designed for half-duplex communication and compatible with coaxial cabling and connectors, the 51C may find a home in some commercial local networks tied to remote mainframes. Data flows one way on a half-duplex line — a condition better suited to the word-oriented tasks that gorge many local nets than full-duplex mode, the two-way flow capability held necessary for interactive DP.

Interface Feature

Among the features introduced for the seven new 3274-21 and 3274-31 control unit models is an interface feature for the 3274-21C and 3274-31C that allows communication line speeds as fast as 57.6K bit/sec under the Synchronous Data Link Control (SDLC) protocol and up to 9,600 bit/sec under the Binary Synchronous Communication (BSC) protocol.

This interface feature meets recommendation V.35 of the Consultative Committee on International Telephone and Telegraph and is also available for the 3274-1C and 3274-51C. Besides the V.35 interface feature, IBM has announced a Digital Data Service Adapter to make up to 56K bit/sec rates possible through Bell's nonswitch Dataphone network for 3274 models 1C, 21C, 31C and 51C under SDLC.

Another feature allows all 3274s to record and send "subsystem summary maintenance statistics" to the host mainframe, whose Network Problem Determination Application can then alert the user's computer center to performance snags in remote terminal clusters.

The 3274-1s and eventually the 3274-21s can be transformed into 3274-31s on the user's premises by replacement of circuits. A 31A or 31D can be made from the 1A, 1B, 1D, 21A, 21B or 21D; and 31Cs can be fashioned from the 1C or 21C.

Users Cautioned

IBM cautioned that users should scrap present plans or orders to buy 3274-1s if they anticipate a need for later upgrading those control units into 31s. The models 31 cost less than comparably equipped models 1, the vendor noted, and upgrading from the latter to the former group requires replacement of base storage at additional cost.

Also, the 31C has a new nonswitched integrated modem capability, IBM said, for 2,400-, 4,800- and 9,600 bit/-sec speeds.

The models 21 and 31 appear the same as models 1 to relevant hardware and software, the Data Processing Division maintained. What will they do for terminal response time and network performance?

The 51C runs at 9,600- or 38.4K bit/-sec over a "direct attached loop." This half-duplex small cluster controller runs at 2,400-, 4,800- or 9,600 bit/sec with a "data link attached loop." Where certain facilities are available, the unit can rev up to 19.2K bit/sec for multipoint communications and attain 56K bit/sec for point-to-point traffic. SDLC is required for rates faster than 9,600 bit/sec.

The price for upgrading 3274-1As to 3274-31As and 3274-31Ds is $5,430 and $6,640, respectively. Upgrades of 1Bs to 31As and 31Ds cost $6,260 and $6,130, respectively. And a 1C becomes a 31C for $5,430, while turning a 1D into a 31A or 31D costs $6,260 and $5,430, respectively.

The four models 21 contain a newer memory technology said to facilitate upgrading to models 31. Costs for upgrading 21s into 31s range from $3,005 to $4,215.

A 15% price reduction applies to orders for at least 25 of any 3274 terminal control units. The 51C costs $6,450, compared to tags of $18,770 for the 1A, 1B and 1D and $13,190 for the 1C. The 21A, 21B and 21D control units cost $18,770; the 21C costs $13,190; both the 31A and 31D cost $21,775; and the 31C costs $16,195.

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3) These books are organized by function. A complete subset of BAL is presented in the first three chapters of the book, and later chapters cover such functions as debugging, table handling, subprogram linkage, and file handling. When material is organized in this way, you learn more quickly because you always see purpose.

4) Each book contains dozens of complete program listings. They start with card-to-printer programs and end with programs that create and retrieve direct files. In between there are listings for routines and programs that perform code translations and input validations, set up the linkage between mainline modules and subprograms, load and use tables in storage, create and retrieve sequential and ISAM files, and so on. As a result, you will have many models of professional coding techniques upon which to build.

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Content

The intent of these books is to develop a basic programming skill in assembler language. As a result, the initial emphasis of each book is on a professional subset of BAL along with the related debugging skills. If you did nothing more than master this material (chapters 1-5), I think you would justify the cost of the book several times over.

Beyond this, table handling, subroutine and subprogram linkage, and sequential and ISAM file handling are given primary emphasis. Since these are common programming functions, this material is valuable background regardless of the language you normally use.

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Finally, these books show you how to write macro definitions (great background for working with software packages), how to code bit manipulation and translation routines, how to isolate the fields in free-form input data (a common function in teleprocessing programs), and how to work with direct files. This type of material starts you on your way to the more sophisticated tasks required in a computer installation.

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Voice-Response Training System Fits IBM CPUs

AVON, Conn. — Computer Systems Research, Inc. (CSR) has introduced a portable, voice-response computer-aided training system for IBM mainframe users.

The Trainer 3000 is a microcomputer-based turnkey system featuring an Apple Computer, Inc. Apple II microcomputer and the Course Structuring Facility (CSF) authoring language.

CSF is the same language used under IBM's Interactive Instructional System (IIS). Courses may be written under Trainer 3000 or IIS and executed on either system, Computer Systems claimed.

The CSR Trainer 3000

Topics covered in the courses apply to hardware and software configurations available to large-scale users of IBM systems. The courses currently available emphasize system operation and problem resolution for the JES3/-MVS system.

Courses planned for next year include operation and technical problem-solving training for IBM 3081, 30 series 4300 and JES2/MVS systems.

Course material was designed to pretest students to determine what they already know, and then concentrate on what they do not know. It also provides posttesting and final exams.

Several pricing options are available. There is no one-time license fee for the software, however. It must be obtained on a $350/month basis. The hardware may be leased for $450/month, but most firms choose to purchase it on their own, the spokesman added.

Individual courses may be rented for $200/month, and a paid-up license will be issued after 12 months. The Trainer 3000 is currently available from the vendor at 195 W. Main St., P.O. Box 45, Avon, Conn. 06001.

Credit Cards: Thirty in One?

TORONTO — While "smart" credit cards containing programmable microprocessor chips could physically contain all the data now contained on 30 different cards, it is unlikely that governments and businesses will get together to pool such information.

So thinks Robert Herve, manager of operations for the French firm CII-Honeywell Bull, Inc., developer of the "smart" credit card that will undergo a trial usage period in France next year.

However, the information on the cards — which can both enter information into computers and have information entered into them — could be relayed by police to a central terminal to see whether a person had any warrants or charges outstanding, Herve acknowledged as reported recently in an article in *The Globe and Mail*, published here.

Furthermore, refinements of the present smart card may be even more formidable, according to the article. The company is said to be planning to include a fingerprint or "voice print" in the card's 8K-bit memory to be compared with a person's actual fingerprint or voice as a "fool-proof" identifier.

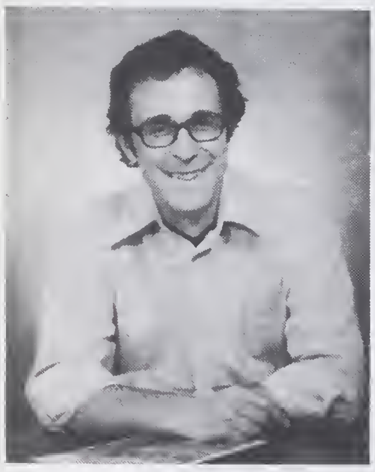
"To the question of whether all the information can be stored on the one card, I must give a Norman answer: yes and no," Herve said.

"Yes, there is nothing technically impossible about storing all kinds of information and no, in France at least, I don't think the various places, the government, the stores will get together to put the information on one card," Herve continued.

In use as an "electronic check," the card would record in its memory any transfer of funds made into the holder's electronic account at the bank.

The user would then present the card and a personal identification number to a retailer whose terminal would verify that the user still had money in the bank to pay for his purchase.

A unique feature of the card is that if it is stolen, the smart card can be programmed to electronically "self-destruct." When a retailer transfers his information about a day's purchases to the bank's computers via telephone, it automatically transmits the serial numbers of outdated or stolen cards back to the retailer.



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creative computing

"The beat covered by Creative Computing is one of the most important, explosive and fast-changing."—Alvin Toffler

David Ahl, Founder and Publisher of Creative Computing

You might think the term "creative computing" is a contradiction. How can something as precise and logical as electronic computing possibly be creative? We think it can be. Consider the way computers are being used to create special effects in movies—image generation, coloring and computer-driven cameras and props. Or an electronic "sketchpad" for your home computer that adds animation, coloring and shading at your direction. How about a computer simulation of an invasion of killer bees with you trying to find a way of keeping them under control?

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Computers are not creative per se. But the way in which they are used can be highly creative and imaginative. Five years ago when *Creative Computing* magazine first billed itself as "The number 1 magazine of computer applications and software," we had no idea how far that idea would take us. Today, these applications are becoming so broad, so all-encompassing that the computer field will soon include virtually everything!

In light of this generality, we take "application" to mean whatever can be done with computers, *ought* to be done with computers or *might* be done with computers. That is the meat of *Creative Computing*.

Alvin Toffler, author of *Future Shock* and *The Third Wave* says, "I read *Creative Computing* not only for information about how to make the most of my own equipment but to keep an eye on how the whole field is emerging.

Creative Computing, the company as well as the magazine, is uniquely lighthearted but also seriously interested in all aspects of computing. Ours is the magazine of software, graphics, games and simulations for beginners and relaxing professionals. We try to present the new and important ideas of the field in a way that a 14-year old or a Cobol programmer can understand them. Things like text editing, social simulations, control of household devices, animation and graphics, and communications networks.

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As the premier magazine for beginners, it is our solemn responsibility to make what we publish comprehensible to the newcomer. That does not mean easy; our readers like to be challenged. It means providing the reader who has no preparation with every possible means to seize the subject matter and make it his own.

However, we don't want the experts in our audience to be bored. So we try to publish articles of interest to beginners and experts at the same time. Ideally, we would like every piece to have instructional or informative content—and some depth—even when communicated humorously or playfully. Thus, our favorite kind of piece is acessible to the beginner, theoretically non-trivial, interesting on more than one level, and perhaps even humorous.

David Gerrold of *Star Trek* fame says, "*Creative Computing* with its unpretentious, down-to-earth lucidity encourages the computer user to have fun. *Creative Computing* makes it possible for me to learn basic programming skills and use the computer better than any other source.

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At *Creative Computing* we obtain new computer systems, peripherals, and software as soon as they are announced. We put them through their paces in our Software Development Center and also in the environment for which they are intended—home, business, laboratory, or school.

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More Time to Prepare

Postal Service Delays Nine-Digit Zip Until June

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service (USPS) has delayed implementation of its nine-digit Zip Code program until June 1.

The Zip Code expansion had been scheduled to begin next month with release of computer tapes, containing the formats of the new codes, that would have allowed businesses to begin converting their address files to the longer Zip Codes.

Announcing the postponement Jan. 2, Postmaster General William F. Bolger said the additional four months will give the USPS more time to work with mailers and the general public in preparation for the new codes.

In addition, Bolger said the USPS will announce in March proposed incentives for volume mailers to adopt the new Zips.

The Postal Service acknowledged that many mailers want to know the incentives before deciding whether to restructure their address files for the new codes, whose use will be voluntary.

Bolger said the delay "is consistent with the proposed Congressional amendment that was dropped in the waning hours of the recent session, which stated that appropriated funds should not be used to implement the nine-digit Zip Code program before June 1."

The amendment, although passed unanimously by the Senate last month, 90-0, and initially approved by the House of Representatives, was dropped during end-of-session wrangling between the two bodies over federal agency appropriations legislation.

Keeping the Spirit

"In keeping with the spirit of that amendment — even though it did not become law," Bolger said, "we will continue the developmental work that the amendment not only allowed but encouraged."

Expanding on that point, USPS spokesman Robert Becker said last week "the postponement is in consonance with the wishes expressed in that Senate vote.

"There was a message there," Becker said. "When Congress speaks, we're going to listen. "The Senate felt we should delay and further assess the impact, refine what we're trying to do — refine the entire system — before we put it into effect," Becker noted.

"They wanted us to proceed with all due caution," he added.

Between now and June, the Postal Service will continue perfecting the computerized address tapes and will hold seminars around the country on the technical aspects of the Zip Code expansion program to help businesses prepare for it.

The extra time, Becker said, will allow the Postal Service to allay fears about the costs and impact of the new Zip Codes.

"There's a lot of confusion out there," he noted. "There's a lot of apprehension about really what this is going to cost people, what is going to be required of them," Becker added.

Apprehension Lifted

Addressing the incentives to be announced in two months, Becker said, "I think you'll find that once those incentives are unveiled a lot of the apprehension that we're seeing is going to begin to evaporate.

"Obviously businesses are going to be very apprehensive about spending money up front [to implement the new Zip Codes] when they don't know what's going to come behind that in the form of benefits," he said.

But, he added, in light of the inevitable implementation of the program, many companies are already preparing to use them.

The Postal Service itself is going ahead with plans to purchase equipment to sort the new Zips, he said. Installation of that equipment should start sometime later this year.

Announcing the delay of the new Zip Codes, Bolger was careful to reassure mailers that no deadlines will be set for conversion to nine digits and there will be no penalties for nonuse.

LPC Answers Questions About Nine-Digit Zip Code

WASHINGTON, D.C. — The List Processing Co. (LPC) is providing American businesses free answers to 80 commonly asked questions about the coming nine-digit Zip Code.

The Q&A format was developed as part of LPC's statement in late November to the Senate subcommittee hearing on the topic chaired by Sen. John Glenn (D-Ohio).

In his statement, LPC Executive Vice-President James E. Pehta expressed concern that the Postal Service better explain the ramifications of the new Zip Code.

In his Senate statement, Pehta added, "How much can we save or reduce our total postal costs with the nine-digit code is the question we should ask, not how much is this program going to add to our costs."

The 80 questions may be obtained from LPC at Daly Associates, 702 World Center Building, Washington, D.C. 20006.

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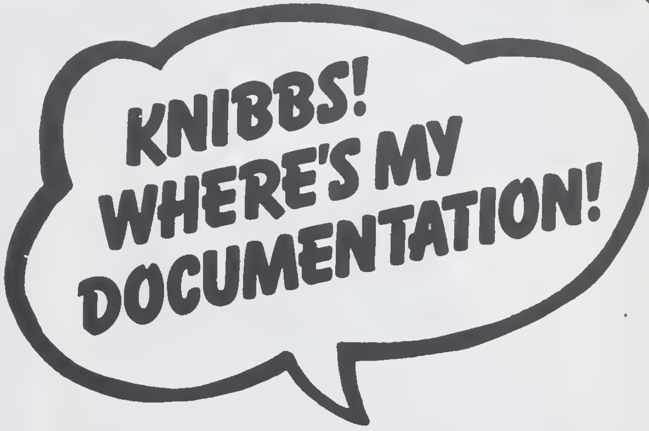
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Check Guarantee Firms Escape Fair Credit Act

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Burgeoning check verification services that store information on millions of citizens' check-writing habits are not required by law to permit the consumer to verify and correct his own records.

Unlike credit bureaus, which are regulated by the Fair Credit Reporting Act, check verification and guaranteeing organizations make little information about themselves known to consumers, besides displaying decals on the doors of merchants' stores, according to the November issue of *Privacy Journal*, published here.

Furthermore, the decline in the use of credit by consumers is causing the number of checks exchanged in the nation's commerce to enjoy an increase of 7% per year, the *Journal* reported.

Therefore, credit bureaus — which report consumer bill-paying records to creditors — have diminished "slightly" in importance, while check verification and check guarantee services are becoming more important to consumers, the publication suggested.

While the Carter Administration proposed that such firms be required by law to disclose information to consumers for review, in Title III of its proposed Fair Information Practices Act, attention has focused instead on Title V of the bill, which covers insurance companies.

For check guaranteeing services, a merchant pays approximately 2.5% of a check's face value and must give the customer's identity by telephone to the check guarantee firm.

The check guarantee firm then matches the information against a computerized master file of people who have passed bad checks, *Privacy Journal's* report explained. If a bad check is called good by the guarantee firm, the firm must pay the amount of the check to the merchant.

In check verification, the merchant pays a smaller fee, gives the verification firm the same information and accepts or rejects the check with no guarantee that the verification firm will make up any loss.

In nine out of 10 cases, merchants ask for verification, not guarantee, the *Journal* reported.

Leading Firms

The leading firms, both operating nationally, are Telecheck Services, Inc. in Denver and Telecredit, Inc. of Los Angeles. Telecheck alone has more than 50,000 subscribers in 53 cities, according to its national accounts manager, Bob Shay.

Both Telecheck and Telecredit indicated that if a consumer complains about a report made to a merchant about his check writing, the firms will investigate the situation and correct any errors in their files, although neither is required to do so.

Telecheck, recently acquired by Tymshare, Inc. — "which gives you some idea of our communications capabilities," Shay said — has files on "several million" people, he noted.

The data on file ranges from an ID number — driver's license number or major credit card number — to name, address, telephone number and ID number, depending on the extent of contact Telecheck has had with the consumer.

Constant Updates

With 60,000 merchant inquiries per day, Telecheck is constantly updating its files, Shay said. "Our primary source of information on bad checks is the stores we service," he explained.

The firm also buys "negative data" lists from large merchants and obtains some credit information from credit bureaus, Shay added. "We're coming very close to being a credit bureau, but actually we're not," he observed.

Even though Telecheck has files from credit companies, "unless we find [information on] a bad check, we cannot tell the merchant not to take the check," Shay said.

Telecheck can, however, issue a "Code 2," indicating that it will not warranty the check because of the consumer's bad credit rating, and not necessarily because of a history of writing bad checks, he added.

While not actually a credit bureau, Telecheck reportedly voluntarily adheres to all the rules and regulations that apply to credit bureaus. "Otherwise we'd be asking for trouble," Shay observed.

Once a bad check is made good, Shay explained, it is taken off the "negative data" list. Telecheck relies on the merchants involved to inform Telecheck when bad checks are paid up, he noted.

IBM Package Pinpoints Power Loss

By Bob Johnson
CW New York Bureau

HICKSVILLE, N.Y. — Losses of electrical power to Long Island Lighting Co. (Lilco) customers is now being restored with the help of an IBM software package which locates the disturbances by using a customer's telephone number.

The Computer-Assisted Restoration of Electric Service (Cares) program, installed earlier this year, locates the records of nearly 900,000 customers using their seven-digit telephone number and then the customer account with a nine-digit code that zeroes in on the geographic location.

The outage appears at a terminal on a geographic grid area. A graphic map then overlays the grid showing power lines, switches and fuses. These findings are then compared with a large lit wall map which includes actual streets. A determination is made as to where the problem is and a crew is dispatched to the area.

Using an IBM 3033 CPU, the Cares system has replaced the old manual card system and has virtually eliminated paperwork, according to Lilco.

Presently located at Lilco's central division, plans are to expand and service nearly three million residents by the end of 1981.

Athur C. Pietrow, director of computer services, stated that at the height of a recent storm, a crew was able to locate a power disturbance within 200 feet of where it actually was.

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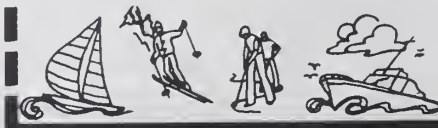

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Automated Phone Dialer Hunts Atlanta Slayer

By Marguerite Zientara
CW Staff

ATLANTA — A microprocessor-based automatic telephone dialing system is being used by police here in an effort to find clues to the child murders and disappearances that have plagued the city since July.

Lent free of charge to the city by Telephone Broadcasting Systems, Inc. (TBS) of Dallas, the Tele-Computer system is placing 1,500 to 2,000 calls per day in the neighborhoods in which a child lived, disappeared or was found murdered, according to Public Safety Commissioner Lee Brown.

Begun a month ago, the project came about through the efforts of an Atlanta attorney, Larry Ruff, who became interested in the concept behind TBS "six to nine months ago," according to Martin Durbec, vice-president and general manager of TBS.

Public Spirit

The decision to donate the system to Atlanta was made because "our chairman, Bob Adler, is very public spirited," Durbec said. The system is expected to call between 30,000 and 50,000 numbers, all supplied by the police.

Each call that is dialed by the computerized system carries a recorded message from the public safety commissioner and a parent of one of the slain or missing children. Responses are taped, transcribed and reviewed by police.

The message is a plea for information. The first calls were placed within a two-mile radius of the shopping center where the latest victim, a nine-year-old boy, was last seen, Brown said.

Initial calls were also made in the area surrounding the spot where the boy's body was found, Brown noted. The mystery involves 16 children, five of whom are missing, and 11 known homicide victims.

When a call is answered by an Atlanta resident, a live operator sees the name of the person called displayed on the CRT screen of the Intel Corp. Z-80 microprocessor, Durbec explained. That is the signal for the operator to come on the line and ask, "Is this the head of the household?"

If the answerer is the head of the household, the operator asks him or her to please hold on for the public safety commissioner and then the tape recorded message plays. The operator can immediately go on to the next call without waiting for the first one to end.

The use of the system — which normally costs $150,000 for 90 days' use — follows a door-to-door canvassing effort by the police that covered every residence in Atlanta, Brown said.

While there will be some duplication of people contacted for possible clues, the police feel the telephone interview method may be more successful than in-person visits.

"There are some people who will just not feel comfortable talking if they've got a police car sitting out in front of their house or a person in uniform," Brown said.

"Here we're making it completely anonymous; they're in their living room; they can hear the voice of the public safety commissioner and the voice of the mother asking for assistance."

The Z-80 has two Shugart Associates, Inc. 8-in. floppy disks, five S-100 boards and a Motorola Corp. CRT screen, Durbec said. There is a master control program that allows up to eight telephone lines to be in use simultaneously, he added.

System's Use Normally Strictly Commercial

DALLAS — The firm that has donated its microprocessor-based automatic telephone dialing system to the City of Atlanta in an effort to find clues to a number of murders there (see related story) normally uses its equipment for strictly commercial enterprises.

Seven-year-old Telephone Broadcasting Systems, Inc. (TBS) has five areas of interest, according to Martin Durbec, vice-president and general manager. Those areas are political calls, promotional calls, account management, message response systems such as bank-by-phone and fund-raising.

In the area of political calls, Durbec said, both President Jimmy Carter and President-elect Ronald Reagan were clients in their recent bids for the presidency.

"In this particular case, we were in the business offering a service to whoever bought it," Durbec said. "There's no bias at all."

The nature of the political effort is a get-out-the-vote campaign, done also at the state and local levels, he indicated.

Promotional calls target receptive audiences — "for example, selling golf balls to golfers" — with a success ratio that can be "extremely high, and I'm talking 60% to 80%," Durbec said.

When asked if the firm received complaints from consumers about getting advertising on their telephones, Durbec responded, "No, we haven't," citing collection agencies whose collectors make over 150 calls a day now.

In addition, department stores have people on the phone all day long advertising, as well, he claimed. "We're really professionally providing an automated phone bank service rather than having one person on the telephone line all day long.

"Our machine with one person can run eight lines, and the productivity on each line can be two or three times that of a normal person," he added. The system, based on Intel Corp.'s Z-80 microprocessor, features "automated dialing, higher line utility and higher productivity," he said.

Account Management

As for account management, which involves "anything from department store accounts to credit cards and bad checks," Durbec observed, "We've reached a stage in society where, frankly, the letter that is mailed to the consumer is typically not even opened.

"We've found a tremendously high success level with a call of this type where it's made to the individual consumer; it's properly directed; it's recorded and he or she is made aware it's recorded," Durbec said.

At the end of the call, he noted, the system plays back to the consumer the entire conversation and asks whether there are any further questions.

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Comnet '81 Opening Tomorrow in Houston

HOUSTON — The Communication Networks Conference and Exposition (Comnet '81) opening here tomorrow will usher in the new year by examining telecommunications trends and addressing what lies ahead for the industry under the new administration in Washington.

The conference, which will be held at the Albert Thomas Convention Center, is sponsored by CW Communications, Inc.'s Conference Management Group.

To kick off Comnet '81, the conference's general chairman, Richard E. Wiley, partner at Kirkland and Ellis, a Washington, D.C. law firm in communications practice, has arranged a series of panels of Washington experts and Southwestern users and vendors.

The kickoff session will be "Legislative and Policy Framework for Telecommunications in the 1980s" moderated by Wiley, with a panel that includes Anne Jones, commissioner with the Federal Communications Commission (FCC); Gus Grant, president of Southern Pacific Communications Co.; Jack Biddle, executive director of Computer and Communications Industry Association (CCIA); Rep. James Collings, member of the House Telecommunications Subcommittee; and William W. Betteridge, AT&T assistant vice-president of rate and tariff planning.

A panel on the Second Computer and Communications Inquiry will examine the issues surrounding the doctrine of competition and the events that opened up new communications products and services to the marketplace.

Helen Deutsch of the National Telecommunications and Information Administration will serve as moderator on a panel that includes Phil Verveer, chief of the FCC Common Carrier Bureau; Phil Nyberg, formerly CCIA general counsel, now with MCI Telecommunications Corp.; and Phil Walker, general counsel of GTE Telenet Communications Corp.

Featured speakers at the conference will include Allen J. Krowe, president of IBM's Communications Division, speaking on how telecommunications impact a business in terms of profitability and resource employment; Robert LeBlanc, vice-chairman of Continental Telephone Co., who will examine the winners and losers in the marketplace as well as likely future trends; and Dr. C. Jackson Grayson Jr., chairman of the American Productivity Center, exploring how the industry affects U.S. national productivity.

Comnet will also feature a panel discussion on how the "Bus," or "Bell Unregulated Subsidiaries" affect the competitive products and services offered by other firms.

And Comnet's annual "Town Meeting" debate will be held, in which leading executives, regulatory policymakers, along with representatives from investor and user interests debate the future of AT&T and its impact on the communications industry.

This year's theme is titled "The Future of AT&T," subtitled "For Whom the Bell Tolls" and deals with the move of unregulated subsidiaries of the Bell systems into the marketplace.

MCI Plans to Go on Road With Wats Tariff Course

NEW YORK — "The New Wats Tariff: How to Best Manage Usage-Sensitive Services for Small, Medium and Large Corporations" is a one-day course to be offered across the U.S. this spring by MCI Telecommunications Corp.'s Education Center.

Priced at $190 per person, the course proposes to dissect the new Wats tariff, with special emphasis on how to achieve the most efficient cost per minute; explore alternatives to Wats, including those offered by other common carriers; show how individuals can further reduce and control their company's phone bills via computer control switches; and help evaluate the cost efficiencies of the traditional applications of inbound Wats.

The Education Center continues to offer a pair of two-day courses on "Telephone Cost Control" and "How to Buy PBXs," and a four-day course titled, "Telecommunications Management for Profit." Scheduled cities for the winter semester include New York, Chicago, Los Angeles, San Francisco, Dallas, Minneapolis, Philadelphia, Boston, Washington, Milwaukee, Houston and Detroit.

More information can be obtained by writing or calling Linda Starek, manager of national accounts, 1301 Ave. of the Americas, New York, N.Y. 10019.

DPMA to Offer Software Courses On West Coast

LOS ANGELES — "Software Configuration Management" is the title of a two-day seminar being conducted by the Los Angeles and San Francisco chapters of the Data Processing Management Association's (DPMA) Education Foundation.

The program is being offered in San Diego, Feb. 9-10; in San Francisco, Feb. 12-13; and in Los Angeles, Feb. 26-27.

Presenting the curriculum will be H. Ronald Berlack, who is presently the configuration manager for the Federal Systems Group of Sanders Associates, Inc. Berlack will cover all phases of the software configuration development cycle in his lectures, including status accounting, operational and maintenance configuration management and writing the software configuration management plan.

Registration for this program is $405 for DPMA members, and $425 for nonmembers, with group discounts available. Additional information can be obtained from the DPMA Education Foundation, P.O. Box 91295, Department SCM, Los Angeles, Calif., 90009.

Correction

The Hospital Information Systems Sharing Group's Jan. 20-23 seminar on "Cost Containment, Planning and Implementing Computer Systems," will be held in San Diego, not Long Beach, Calif. [CW, Dec. 1]. Further information is available from the group at 2415 S. 2300 West, Salt Lake City, Utah 84119.

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To Coordinate National Activities

Institute for U.S. Information Policy Proposed

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A federal Institute for Policy and Research to coordinate the formulation of national information policies has been proposed in the House of Representatives.

The institute, to be established in the Executive Office of the President, would "provide a forum for the interaction of government, industry and commerce and educational interests" in developing information policy options, according to the legislation introduced last month by Rep. George Brown, Jr. (D-Calif.).

The institute would also serve as a focal point for "planning and coordinating federal research and development activities related to information science and technology."

U.S. Leadership

The legislation, aimed at maintaining and enhancing U.S. leadership in information science and technology, grew out of a series of congressional hearings over the last year and a half on information technology and education.

According to a staff member of Brown's science and technology subcommittee, the findings of those hearings led to recommendations for possible actions by the new Department of Education. The more general findings on the state of the U.S. information economy resulted in the Brown bill.

The bill was introduced too late in the last session of Congress to be acted on, but will be reintroduced early in the new Congress, possibly redrafted after the subcommittee receives recommendations from the several hundred industry, government and academic organizations asked to comment on it, the staffer said.

The bill, known as the Information Science and Technology Act, states that new developments in information technology afford great economic and scientific opportunities for the U.S., opportunities now lessened by a lack of coordinated national policies and by international issues, such as transborder data flow.

The legislation sees a need for a "comprehensive national effort" to address these and other information-related issues and to bring together public and private interests to discuss national information concerns "in a cooperative forum."

"The nation's ability to exploit technological advances to achieve economic progress, to compete in world information markets and to prepare citizens for participation in the information society is imperiled by a lack of a coordinated analysis of the implications of information technology," the legislation says.

The proposed information institute would be comprised of representatives of "organizations and institutions with a significant interest in information policy."

A 15-member board of directors would represent the federal government, private sector information businesses and education, scientific and as well as other professional communities.

Under the leadership of the institute's director, to be appointed by the President and approved by the Senate, the institute would, among other things:

- Collect and assess data about development and trends in information science and technology throughout the world, including foreign government efforts to develop national information policies.
- Propose "broad national goals for the productive and humane use of information technology."
- Conduct and support research into "issues concerning human interaction with and acceptance of information technology in the home, school and work place."
- Investigate policy options for federal information R&D.
- Analyze international information policy issues, including access to information systems by less developed countries.
- Study and make recommendations for more efficient government use of information technology.

The legislation suggests the President could transfer to the institute "any or all information or information science and technology-related research programs or policy studies and analyses" of other federal agencies.

First year appropriations for the institute would be $20 million, rising to $30 million two years later. The institute would have a 10-year life unless extended by the President.

The funding level was characterized by the subcommittee aide as "relatively small" considering the broad scope of functions proposed for it.

> *'The nation's ability to exploit technological advances to achieve economic progress, to compete in world information markets and to prepare citizens for participation in the information society is imperiled by a lack of a coordinated analysis of the implications of information technology.'*

Honeywell to Conduct Two Management Seminars

PHOENIX — Two consecutive management seminars on data bases will be conducted here by Honeywell, Inc. the week of Jan. 26.

"Data Base Concepts" will introduce the non-computer-oriented manager to terminology and principles of data bases and explain what benefits data bases can yield.

"Data Base Administration" was designed for managers with a DP background to help them in their day-to-day management of a computerized data base.

Both seminars are geared to users of any type of computer system or data base, Honeywell noted.

The first two-day seminar costs $325 per person, and the second seminar, which runs three days, costs $495.

Both sessions can be attended for $695, and prices include lunches and all course materials.

Further details are available from Data Base Seminars Registrar, Honeywell, M/S T-99-4, P.O. Box 6000, Phoenix, Ariz. 85005.

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Federal Agencies' Backup Plans Poor: GAO

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Federal agencies have failed to practice effective risk management, according to Congressional auditors, who said a recent review of 55 government DP operations did not find a single adequate backup plan.

Many agencies are providing DP backup capabilities only through mutual written letters of agreement, according to the findings of the General Accounting Office (GAO), which said in most cases the agreements are not worth the paper they are written on.

The agreements, in almost every instance, do not satisfy agency obligations under the 1978 Office of Management and Budget (OMB) directive outlining agency responsibilities for establishing DP backup plans sufficient for maintaining continuity of operations in the event of a disaster.

Strong Reliance

Most federal agencies rely heavily on DP systems for carrying out their programs, the GAO noted, adding that "extended loss of the ADP systems that support programs such as Social Security, Medicaid, welfare, pensions or payrolls could create financial chaos for the programs' recipients."

In spite of their reliance on DP, the GAO said, federal agencies put less importance on backup plans than on private corporations.

For the most part, heads of federal departments and agencies are not even aware of the importance of establishing policies and procedures to ensure appropriate backup plans are developed and maintained, the GAO study continued.

The GAO reached its conclusions after surveying 55 DP activities within the Departments of Agriculture, Commerce, Defense, Justice, Labor and Treasury. The auditors also visisted other federal, state and local government offices and made a comparative analysis between the government and private sectors by visiting 17 firms representing seven major industries including transportation, manufacturing, banking and insurance.

Unfulfilled Responsibilities

The resulting report, issued last month, said the "GAO found not only a lack of understanding in the federal government of the importance of ADP backup planning, but also that agency top management has not fulfilled its responsibilities for implementing Office of Management and Budget requirements for such plans."

The GAO found that many agencies use interagency agreements, promising sharing of processing time, to provide backup capability. These agreements — in some cases only oral — generally do not meet OMB requirements, the study said.

Backup arrangements under these agreements in many cases are old and untested, the report continued, and if called upon could lessen the ability of the loaning agency to meet its own needs.

The arrangements are further complicated by operating system modifications made by agencies that do not correspond to the operating environments of other agencies supposedly prepared to offer backup facilities.

Except for one such arrangement studied, the GAO said, "We found no backup agreement that had even identified the agency's critical software applications and assigned priorities to their processing."

'Many Deficiencies'

On the whole, the report concluded, these agreements "contain many deficiencies" including:

- The agreements are not always current.
- Fulfilling the agreements would put both parties "in an emergency situation."
- The backup capability is not periodically tested to ensure system compatibility.
- Most agreements contain only a single option.
- "Most important, agreements contain no guarantees that the backup equipment will be made available in event of need."

The report said the risk agencies run through inadequate backup planning is unnecessary in light of the DP backup services now available from commercial vendors of backup services.

Guidance for OMB

Besides urging agency and department top management to become more aware of the need for backup arrangements, the GAO issued the following recommendations for OMB:

- Establish a mandatory requirement for every department and agency to organize a DP executive committee, to include top management, that would report its activities to OMB before OMB approves the department's or agency's fiscal budget.
- Reaffirm that agencies should test their backup plans periodically.
- Request that the inspector general or internal audit groups within each agency evaluate backup plans, review tests and test results in accordance with OMB criteria and report their evaluation to the DP executive committee.
- Ensure the Commerce Department develops standards for backup plans.
- Issue a policy cautioning against modifying operating system software because of the difficulties the modifications can cause for backup arrangements.

Correction

The vendor of NCSC Database, listed in the chart of "Proprietary Software: User Ratings and Cluster Analyster Analysis" on Page 18 of the Dec. 22 issue, is Nixdorf Computer Software Co., not Nixdorf Computer Corp.

'Managing People' Topic Of One-Day Pryor Seminar

MISSION, Kan. — "Managing People" is the name of a one-day program being offered in a variety of locations by Fred Pryor Seminars.

It will be held in Boston, Jan. 14; Rochester, N.Y., Jan. 15; Springfield, Mass., Jan. 19; Syracuse, N.Y., Des Moines, Iowa and Los Angeles on Jan. 20; New Orleans, Jan. 27; Chicago, Jan. 28; Houston, Jan. 29; Mobile, Ala., Jan. 30; Kalamazoo, Mich., Feb. 2; and winds up in Greenville, S.C., on Feb. 2.

The seminar focuses on the following managerial problems: motivating people; "problem people"; human behavior; predicting what other people will do; building assertive leadership skills; opening closed minds; avoiding self-defeating behavior; avoiding negative surprises; defusing a crisis; and living smarter instead of harder.

Cost of the program is $125 per person and includes all materials and lunch.

Further details can be obtained from the Registrar, Fred Pryor Seminars, P.O. Box 2951, Mission, Kan. 66201.

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GAO Report Criticizes Aging Federal Systems

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — While not exactly an official cemetery for the DP industry's old iron, the federal government's aging computer inventory has long been recognized as an acute problem for agency DP managers.

The typical federal computer in use today is a 1965 technology processor acquired in 1971 for about $450,000, according to a recent estimate. Only 2% of the large and medium-scale computers in federal use are of post-1975 technology.

Although it is difficult to place a dollar figure on the problems of obsolete equipment, the General Accounting Office (GAO) said last month a survey of four federal installations indicated possible savings of $1.4 million could be realized by replacing older equipment at just those sites.

The GAO blamed the obsolescence problem on inadequate General Services Administration (GSA) oversight, on "the current murky acquisition cycle, which is long, complicated and frustrating," and on "management shortfalls" — failure to recognize and evaluate available economical alternatives.

Effectively addressing the management problems, GAO said, "will improve the use of federal ADP resources and will work toward dissolving the credibility gaps that exist among agency top management, the Congress and those responsible for the overall management of federal data processing."

Report Basis

In preparing its report, the GAO discussed the obsolescence problem with federal officials, computer manufacturers and DP associations and visited or contacted more than 20 "typical" federal facilities processing large or medium-scale scientific or general business applications.

The study focused on the 1,366 medium and large-scale federal computers identified in the April 1979 government DP inventory.

More than half of those computers, the GAO found, were technology of the 1971 era or earlier and almost a third were technologically 15 years old or older.

In general, the GAO concluded, "the operational costs of obsolescent, government-owned equipment can exceed the costs of using newer equipment even if the newer equipment is obtained on a short-term basis."

Costs Overlooked

Many federal DP managers have failed to identify all the costs associated with using outmoded equipment, the report said.

"They are overlooking high operating expenditures, extraordinary maintenance expenses, excessive energy consumption and additional costs of supplemental services," the GAO report added.

In many cases, the GAO said, replacement costs could be justified by savings possible through lower maintenance power and cooling costs of newer equipment.

The report also addressed "hidden costs" associated with using older equipment, such as extra expenses attributed to greater personnel requirements, system unavailability, larger floor space requirements, limitations on input/output capacity and numbers of disk units and other peripherals, obsolete operating systems and the lack of migration paths to more advanced systems.

Standing Criticism

The GAO agreed with a standing private-sector criticism of federal procurement, saying "heavy emphasis on the lowest hardware price has often left the ADP user 'penny wise and pound foolish."

Under the present procurement regulations manufacturers have at times successfully proposed obsolete equipment to meet federal needs, the report noted.

GAO Recommendation

The report recommended federal agencies immediately determine, with GSA guidance, if their systems are economically outmoded.

GSA, the report said, should outline for agencies the criteria for cost comparisons to determine whether equipment is outmoded and set procedures for "expeditiously replacing" that equipment.

In addition, the GAO said, GSA should work with the Office of Management and Budget (OMB) to require that:

- Replacement systems obtained on the basis of the cost comparisons be approximately the same relative computing power as the old systems.
- Replacement computers use existing software where possible.
- Agencies commit themselves to periodic reporting to OMB and GSA on progress toward replacing obsolescent software with standard high-order languages, implementing other federal DP standards and assessing their use of data processing in carrying out their missions.

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PDP11/34	31800	1650	1860	2550
PDP11/44	42600	2200	3075	—
PDT11/151	7995	445	580	750
MNC11/03	—	810	1080	—
MNC11/23	—	1429	1805	—
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4012 11 inch screen	7850	500	590	695
4013 ASCII/APL	8800	565	660	775
4014-1 19 inch screen	14200	913	1050	1225
4015-1 ACSII/APL	16250	1046	1240	1460
4016-1 25 inch screen	19500	1250	1450	1650
4631 Hard Copy Unit	4950	310	360	440
4662 X-Y Plotter	4600	285	335	395
4663 "C" size Plotter	11000	710	825	930
4027 Color Graphics	9000	575	685	775
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TEKTRONIX				
4052 Desk Top Computer	10950	700	825	965
4054 Desk Top Computer	19140	1230	1435	1695
HEWLETT PACKARD				
9845T—Desk Top Computer	23500	1195	1595	1945
9872B—4 color plotter	5000	260	345	410
9895A—Dual floppy disc	6500	350	450	550
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GDC—103—300 baud	405	25	30	35
GDC—212—1200 baud	875	45	50	55
CAT Acoustic coupler—300 baud	185	11	17	22

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VT100 CRT	1795	95	137	180
LA120 KSR Decwriter III	2495	135	180	225
LA120 RO Decwriter III	2395	130	170	210
DIABLO LETTER QUALITY PRINTERS				
1650 KSR—Metal Daisy Wheel	3295	165	220	275
1650 RO—Metal Daisy Wheel	2950	150	199	260
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1500	1095	74	86	100
1520—Buffered Printer Port	1450	98	110	125
1552—VT52 compatible	1150	74	92	112
HEWLETT PACKARD				
2621-A—CRT	1495	93	108	130
2621-P—CRT w/blt. in Ptr.	2650	163	180	230
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783 KSR 120 cps Thermal	1695	95	123	150
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Congress to Mull Curbing Problem Drivers

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — One of the first information policy decisions expected by the new Congress this year will be whether to establish a national telecommunications system to help states keep problem drivers off the road.

The system, proposed by the Department of Transportation (DOT), has been criticized as being a blueprint for a national driver license system and as raising issues of federal control over state law enforcement activities, but has received the endorsement of at least one member of Congress.

Rep. James Oberstar (D-Minn.) said recently he will introduce legislation in the 97th Congress to upgrade, along the lines DOT proposes, the National Driver Register (NDR), which states use to check nationwide the records of driver license applicants.

The current register, under the auspices of DOT's National Highway Traffic Safety Administration (NHTSA), is computer-assisted, but depends on the mail to transmit data to and from state licensing authorities.

The delays in data transfer result in some drivers receiving licenses in one state while their driving privileges are suspended in another, according to supporters of the NDR upgrade. By one DOT estimate, there are as many as 14 million illegal drivers on the road today.

The current register is an index, maintained by NHTSA, of drivers whose licenses have been suspended, revoked, canceled or denied. The file now holds some 6.5 million records and is plagued with problems of data quality, accuracy and timeliness. Upgrade of the 20-year-old system was proposed by Rep. Oberstar in 1977, and in 1978 Congress passed the Surface Transportation Assistance Act, which directed DOT to study various proposals for improving NDR.

The resulting DOT study, presented to Congress in November of this year, recommended legislation to establish a Problem Driver Pointer System to be phased-in over four years.

Through the on-line system envisioned, identifying information on driver license applicants would be entered simultaneously into individual state computer data bases and the NHTSA register.

If nothing is found during the NHTSA search, an acknowledgment of that would be sent through the state computer and onto the branch office's CRT terminal screen within 60 seconds and the license application could be processed.

Five-Minute Turnaround

If, however, a hit is registered during the NHTSA search, the inquiring state branch office would be notified that another jurisdiction had a record on the applicant. In addition, a driver history summary would be transmitted by the state of record to the inquiring state within five minutes by way of NHTSA over the same national telecommunications system.

The current remote batch entry/-mailed response system would continue for states without on-line capabilities, DOT said, although it proposed barring states from use of the system after four years if they did not come on-line.

DOT estimated this system concept would result in a data file containing records on approximately 22.3 million problem drivers by the fifth year of operation. By that time, the costs per transaction would be eight cents, the study said.

The problem-driver system during the fifth year would handle approximately 72.5 million transactions, DOT estimated, at a cost of almost $6.5 million. Over the first 10 years, the cost to states and the federal government would approach $71 million.

Besides use of a value-added telecommunications network, the proposed system would require the equivalent of one IBM 3032 mainframe with 400M bytes of disk storage at NHTSA and an IBM 370/168 or equivalent at each state, with accompanying teleprocessors, synchronous ports and memory modules.

Because a successful system would require participation of almost all states, DOT recommended Congress establish the pointer system with a six-year life span so it could be dismantled if it did not gain full acceptance. Or, DOT said, Congress could mandate state participation with sanction — loss of federal funds, for example — for nonparticipation.

A "major deficiency" of the present NDR, DOT said, is lack of a unique identifier, such as the Social Security number (SSN), for each state record. In fact, the study suggested, the proposed pointer system would almost surely fail if the SSN is not used by all participating states. In 1976 Congress specifically provided for use of SSNs by state licensing agencies.

Critics of the proposed system argue the uniform and nationwide recordkeeping effort under the direction of NHTSA could constitute a federally controlled national licensing system.

DOT countered, "the National Driver Register provides the computer facility, software and operation personnel, but the data and all maintenance are initiated by and [arguably] under the management of the states." Because of this state control, worries about federal access to state-held records and possible privacy abuses are not warranted, DOT said.

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Trainers' Desire for Promotion Held Greater Than Students'

By Bruce Hoard
CW Staff

CAMBRIDGE, Mass. — DP trainers have more desire to be promoted than their most ambitious students.

That is the conclusion reached by University of Colorado professor J. Daniel Couger after tabulating the results of his recent survey, *Key Factors for Motivation of EDP Trainers.*

Couger disclosed the results of the survey at a recent conference here. Those results showed trainers with strong needs in several motivational areas.

On a scale of one to seven, the trainers rated their growth needs, or desire to advance their careers and assume positions of power, at a near maximum of 6.37. They dethroned the previous DP career-climbing champs, programmers and analysts, who rated the category at 5.91.

Important Implication

"I've never seen a growth-need scale so high," Couger remarked. "That's a very important implication for managers."

Not surprisingly, the frequently misanthropic programmer/analyst contigent evinced little in the way of social need strength — the need to interact with others — rating it at 4.21 compared to 5.24 for the trainers.

"It's not a surprise for people with high social-need strength to be attracted to the classroom, because of the interaction with students," the *Computerworld* columnist said.

The high trainer growth-need results clearly demonstrate the need for trainers to discuss those needs with training management and even more importantly, DP management, he emphasized. Trainers have a tendency to spend time on directing students' careers while ignoring their own.

The five "core job dimensions" measured in the survey were skill variety, task identification, task significance, autonomy and feedback. Couger described them as essential job motivational ingredients, and respondents were asked to rate how much they felt they had.

Skill variety refers to the demand for an employee's full complement of skills on the job as opposed to the repetition of similar or monotonous tasks. The DP trainers rated their skill-variety level at 5.89; programmer/analysts, 5.41.

Task identification asks the question: Can you identify with the "whole" of your job? Trainers felt they could to the extent of 5.49. Programmer/-analysts checked in at 5.21.

On the question of task significance — do you feel your work is worthwhile? — trainers reflected a 5.70 figure compared to a programmer/-analyst rating of 5.61. "Both scores are very high," Couger noted.

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In Continuing 'Soap Opera'

AT&T Asks Reconsideration of Telpak Ruling

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — The argument over Telpak service — one of Washington's longest-running soap operas — droned onward if not forward last week amid arcane legal maneuvers by Telpak users, the Federal Communications Commission (FCC) and AT&T. The users want to continue the service, while the commission and the telephone company — for different reasons — want to end it.

What they are arguing about is a voice/data communications service that provides a small number of very large users with very cheap service, but underneath that argument is the question of whether AT&T has been allocating its costs fairly among various communication services.

If the answer is "no," the phone company's rates for many services — particularly those which compete with offerings of specialized and value-added carriers — will go up, and the competitors will be encouraged to develop new services.

The Telpak dispute in its current incarnation has been shaped by a series of FCC decisions and court rulings that began in 1976, when the commission decided Telpak rates are anticompetitive. The reason: They are based on a cost-allocation scheme known as Long Run Incremental Costing (LRIC), which, according to the FCC, permits revenue earned from monopoly offerings, like telephone service, to cross-subsidize the private-line services which AT&T markets in competition with specialized carriers.

The scheme favored by the commission and the phone company's competitors is known as Fully Distributed Costing (FDC).

Users Appeal

In 1977, the FCC ordered the phone company to allow resale of Telpak facilities by other common carriers. AT&T decided Telpak would not be economically viable under these conditions and requested permission to terminate the service.

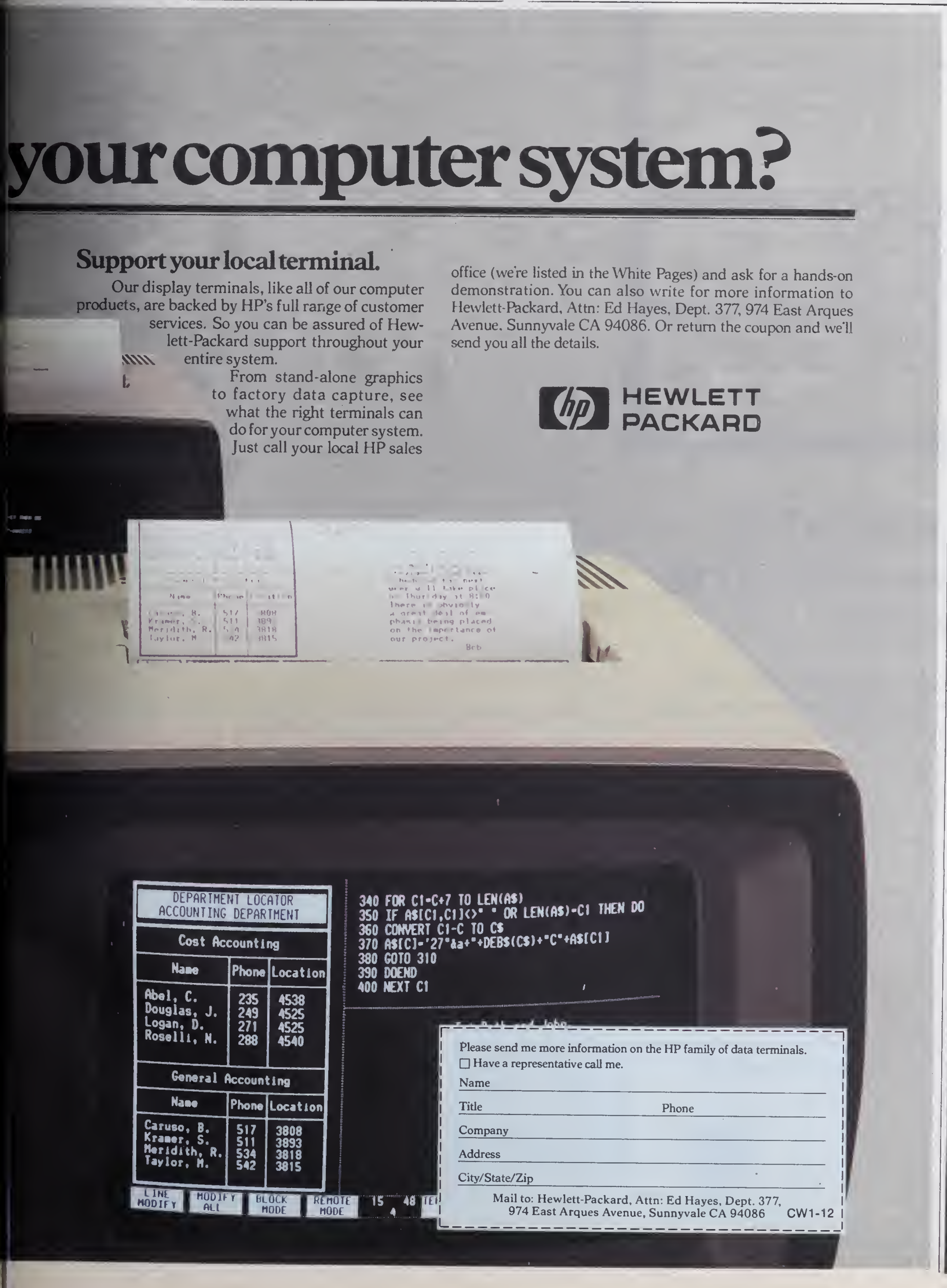
The commission granted the request, but Telpak users went to court and won an order requiring continuation of service to existing Telpak customers while AT&T's cost-allocation methodology and related matters were subjected to judicial review.

Last June, the appeals court completed this review. It agreed with the FCC that Telpak rates are anticompetitive because they are based on LRIC rather than FDC, but it also said the commission had made a mistake in 1977 by not requiring more justification from the phone company for terminating the service.

The upshot was a timetable allowing AT&T to kill Telpak at the end of December 1980, provided the company supplied the missing information. Subsequently, this deadline was extended to Feb. 19, 1981.

Last November, however, the appeals court decided its

(Continued on Page 22)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340 FOR C1-C+7 TO LEN(A$)
350 IF A$[C1,C1]<>" " OR LEN(A$)-C1 THEN DO
360 CONVERT C1-C TO C$
370 A$[C]-'27"&a+"+DEB$(C$)+"C"+A$[C1]
380 GOTO 310
390 DOEND
400 NEXT C1
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FCC Accepts Wats Tariff, But Delays Starting Date

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Although the Federal Communications Commission (FCC) has accepted AT&T's new Wide Area Telecommunications Service (Wats) tariff — which lowers rates for most users but raises them significantly for others — the tariff will not become effective for some time.

The commission has deferred the effective date until May 31, and the tariff's opponents — including some of the nation's largest companies — are virtually certain to seek judicial review of the decision. They also may ask the FCC to reconsider what it wrought just before Christmas. Either of these latter moves could delay implementation of the new rates well beyond May 31.

The major difference between the new and old Wats tariff is that Full Business Day (FBD) and Measured Time (MT) rates have been eliminated.

These rates offered flat rates (discounts) for 240 hour/month of usage in the former case and 10 hour/month in the latter. The new tariff is based on "tapered" rates, which charge a gradually declining amount per hour as usage increases.

Major Effect

The major effect of the change is to lower transmission charges for those customers who make modest use of Wats facilities, while increasing charges for the heavy users. According to AT&T, about 90% of present Wats customers will pay less, while the remainder will pay more.

Actually, because of increases in related charges for such items as terminals, the transmission savings are wiped out or reduced in some cases. Thus, the percentage of customers paying more, overall, under the new tariff, is probably greater than 10%.

Among those paying substantially more are on-line service bureaus, car rental and hotel/motel organizations that operate on-line reservation services.

For example, shortly after AT&T announced its new rates last fall, Avis, Hertz, and Budget Rent-A-Car told the FCC that the new charges would increase communications costs for the auto rental industry by $8 million/year to $18 million/year and add as much as $1 to the cost of a typical car-rental transaction.

Opposition to the new tariff also comes from a number of specialized carriers who would like to extend their present networks by leasing Wats circuits to additional cities. They also would like to offer Wats-like services to users who do not find the phone company's rates attractive.

The major bar, in both cases, has been a regulation forbidding the specialized carriers from reselling Wats facilities. That prohibition was lifted late last year [CW, Oct. 27]. The new Wats tariff offers considerably less opportunity for sharing than the previous rates.

Between now and May 31, when the new tariff is scheduled to go into effect, some of this opposition may disappear.

Off-Peak Rates

To cushion the impact on users, the Commission will investigate the possibility of charging less for Wats service during off-peak hours. AT&T and other interested parties will be encouraged to suggest off-peak rates on their own, but if their response is inadequate, the Commission intends to develop its own scheme.

One possibility, discussed in the text of last month's order, is a 17.5% reduction for service rendered between 5 p.m. and 11 p.m. Monday through Friday and on Sunday, along with a 30% reduction from 8 a.m. to 11 p.m. on Saturday, 8 a.m. to 5 p.m. on Sunday, and every day between 11 p.m. and 8 a.m.

The commission may also decide to phase in the higher rates gradually, in line with a recent suggestion made by FCC Commissioner Joseph Fogarty, who suggested a three-stage phase-in stretched out over 18 months.

FCC, AT&T and Users Continue Telpak Battle

(Continued from Page 21)

June ruling had been premature: Telpak users had not exhausted all their administrative remedies at the FCC, the court said, and until this happened, judicial review would not be proper.

This pronouncement has confused matters somewhat because it appears to mean the court should not have entered the dispute in 1977 or last June. In that case, AT&T might be free to end Telpak immediately.

AT&T, along with the federal government and several other Telpak users, is now seeking reconsideration of the November ruling in an attempt to get this point clarified. Since Telpak will be terminated in either case, the users are virtually certain to appeal the appeals court's ultimate decision to the Supreme Court.

The key question presented to the high court will be whether LRIC is anticompetitive.

Although the FCC has already decided that it is — and the appeals court upheld the commission last June — the latter decision was based on a split vote.

One of the three judges who heard the case — Malcolm R. Wilkey — insisted LRIC is not anticompetitive.

Nevertheless, the users appear to be fighting an uphill battle: They have little to lose, however, by continuing the effort to save Telpak.

If the service ends, their costs will increase by hundreds of millions of dollars per year. Overall estimates are lacking, but two users — Aeronautical Radio, Inc. and the Air Transport Association — told the appeals court several months ago that the demise of Telpak would cost them "well over $100 million/year."

A Supreme Court appeal will almost certainly cost far less.

Tied to Computer Inquiry II

Controversy on Dataspeed 4540 Tariff Escalating

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Competitors' objections to AT&T's recently-filed Dataspeed 4540 tariff [CW, Nov. 17] are "without merit and in no event provide a basis for rejection," the company told the Federal Communications Commission (FCC) last month in what appears to be an escalating controversy related to the Second Computer Inquiry.

The competitors, represented by the Independent Data Communications Manufacturers Association (IDCMA), a terminal manufacturers trade group, objected to the three-tier Variable Term Pricing Plan (VTPP) included in the tariff.

Under this plan, users who lease the Dataspeed 4540 for 48 months pay less than those who sign up for 24 months, while rates for one-month rentals are higher than either of the others (exclusive of termination charges — see below).

The association argued that if some Dataspeed 4540 customers are exempted from future rate increases, users of AT&T's other services will have to make up the loss. Such cross-subsidization is illegal under both the Communications Act and a number of court decisions, the association added.

IDCMA also criticized the termination provisions in the proposed tariff.

Basically, those who rent Dataspeed 4540 systems by the month would not have to pay extra for service cancellation, while those who lease for 24 or 48 months would have to pay to terminate service. If a customer chose one of the latter plans, and terminated service three months later, his total cost, including termination would be as much as 280% greater than the monthly charges for the same period, the association said.

"The large discrepancy between these rates demonstrates that the termination charge is a penalty . . . with the anticompetitive effect of restricting the customer's choice of service alternatives," IDCMA added.

Key Issue

The key issue, however, is not rates but competition.

According to IDCMA, the Dataspeed 4540 tariff represents a phone company attempt to evade the FCC's recent final decision in the Second Computer Inquiry [CW, Dec. 22]. That decision allows the company to offer terminal equipment on a deregulated basis, but only through a fully separated subsidiary. Since the subsidiary has not yet been established, IDCMA contended the proposed Dataspeed 4540 tariff must abide by all the restrictions in the 1934 Communications Act.

For otherwise, the company will "continue to cross-subsidize and engage in other types of anticompetitive activities," thus negating the structural restraints included in the Computer Inquiry decision.

The association's basic contention is that the tariff, as proposed, violates several provisions of the Act.

According to AT&T, however, "IDCMA's self-serving arguments would deny the public the benefits of more flexible payment arrangements for Bell services, which market research has shown customers desire and which are already offered by competing suppliers."

The company added that "in no event will AT&T initiate rate changes for existing customers [if Dataspeed 4540 costs increase]. Aside from the probable legal infirmities of such action, plainly it would be bad business practice to do so."

A major reason for offering the Variable Term Pricing Plan, AT&T added, is because the company's competitors offer such schemes and "customers have come to expect and demand these options." In order for AT&T to compete effectively in this market, the company argued that it must be able to offer like terms.

Regarding the termination charges, AT&T said they were designed to discourage early terminations, which, if allowed, would reduce the overall economic life of the Dataspeed 4540 and prevent the company from recovering a profit from its equipment investment.

"The application of a termination charge provision is neither anticompetitive nor unlawfully discriminatory," AT&T added. "It is reasonably related to cost and its imposition ensures the adequate recovery of capital invested in the service, thereby preventing any possibility that those who terminate early would pay rates below the cost of providing the service."

Circumvention Issue

Regarding the key issue — whether the tariff represents an attempt to circumvent the Computer Inquiry decision, AT&T said the decision "contemplates that the offering of terminal equipment through a separate subsidiary will give AT&T the same regulatory status in marketing [terminal equipment] as any other equipment vendor.

"Clearly, the offering of the Variable Term Payment Plan does not yet give AT&T such status [because competitors allegedly offer more options than are included in the VTPP]. However, AT&T cannot compete effectively under regulation against its unregulated competitors during the transition period unless it also offers the customer a significant measure of rate stability over a reasonable period.

"The VTPP is a step toward establishing methods within the current regulatory regime to enable AT&T to compete better in an eminently fair and reasonable way."

SBS Eyeing North, South Links

CW Washington Bureau

McLEAN, Va. — Satellite Business Systems (SBS) is "exploring" expansion of its new satellite network to Mexico, a spokesman said last week. A short time earlier, the company requested authority from the Federal Communications Commission (FCC) to initiate private-line service between the U.S. and Canada.

SBS has "no plans," at least for now, of becoming an international communications carrier, the spokesman added.

The projected Canadian service, which could begin "as early as the fourth quarter of 1981," would be the first to provide satellite communications between the two countries.

The service would also be the first to provide "fully switched broadband data, electronic mail, teleconferencing and voice capabilities integrated into an all-digital format," the company added.

It explained that existing terrestrial networks can transmit only voice and data between this country and Canada in digital format at speeds up to 56K bit/sec.

Five companies have been signed up, according to the spokesman: General Motors Corp., Westinghouse, Travelers Insurance Co., ISA Communications Services and Wells Fargo Bank.

Initially, SBS plans to service terminals in five southern Canadian cities — Hamilton, Oshawa and Toronto, Ont.; Montreal, Que.; and Vancouver, B.C.

Later, the system may be expanded by using Canada's Anik satellite system to relay signals to and from points further north and east, which are beyond the range of the SBS satellite. A similar "double hop" transmission scheme is being considered for Mexico, the spokesman said.

The Canadian service, which SBS plans to offer in collaboration with a satellite communications carrier in that country, will be available in the U.S. only to customers who lease domestic transmission facilities from SBS.

In addition to the five companies that have already signed up, "several more" have expressed interest, the spokesman said, and he expects the company to announce "three or four more" users by "late winter."

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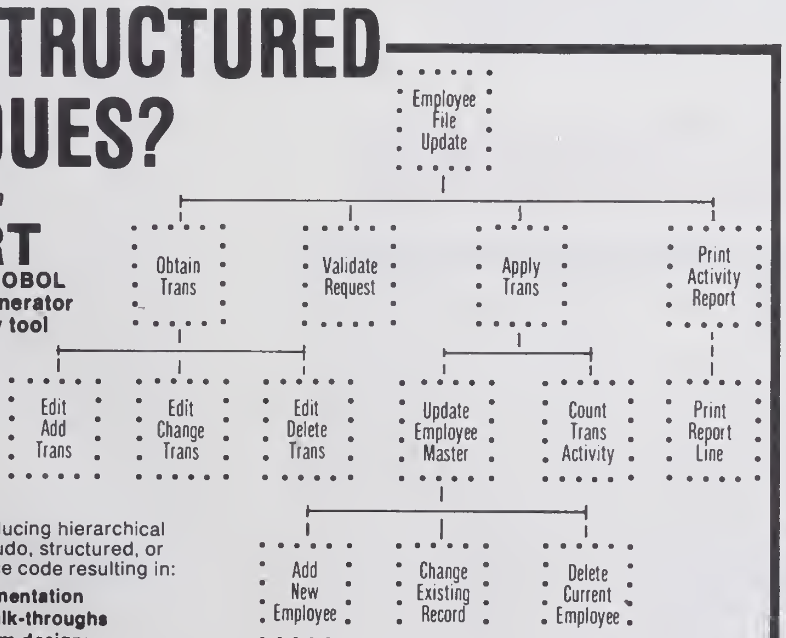

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The Pennsylvania Turnpike Commission hereby advises all interested parties of the intent of the Commission to replace the existing electromechanical Fare Collection system at thirty-eight (38) Interchanges located on the Turnpike System in Pennsylvania

The scope of the proposed project consists of the design, fabrication, testing, installation and maintenance of a new state-of-the-art Fare Collection System consisting of, but not limited to, toll terminals, multi-level ticket issuing machines, axle scale interfaces, toll plaza computer, prefabricated recorder rooms, fare card equipment, EDP computer interfaces, various peripheral devices, software, training, documentation and support services.

Final agreement between the contractor and the Commission will be accomplished through a predefined, negotiated process and NOT through a bidding process. During the selection process, the Commission will determine, on the basis of financial responsibility, related experience, personnel capabilities, and technical proposals, those companies qualified to submit final proposals. Following this qualification process, a final determination will be made on generally two bases: (1) technical proposal and (2) price. Interested parties may request a set of Preliminary Documents which includes an abstract of the total project, preliminary system objective, a partial set of preliminary system objective drawings, and a sample qualification statement. Requests for a set of Preliminary Documents may be obtained by writing to Mr. W.S. Cornelius, Director of Purchases, Pennsylvania Turnpike Commission, Post Office Box 8531, Harrisburg, Pennsylvania 17105. The cost for each set of Preliminary Documents is $25.00 payable by check to the Pennsylvania Turnpike Commission. Requests must be received by the Commission no later the 12 o'clock noon, E.S.T. on January 19, 1981, for PTC distribution of material within ten (10) days after that date. NO REFUND of the cost of Preliminary Documents will be made for any reason.

A general informational meeting of interested companies will then be held. The date will be indicated in the Preliminary Documents.

This notification shall not be construed as a commitment to award any contract.

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Calendar

Feb. 8-13, San Francisco — **DP Training Managers' Workshop.** Contact: Deltak, Inc., 1220 Kensington Road, Oak Brook, Ill. 60521.

Feb. 9-10, New York — **Computer Performance Evaluation: For Improved Planning, Measurement and Productivity.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Feb. 9-11, New York — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Feb. 18-20 in Denver and Feb. 25-27 in Chicago.

Feb. 9-11, New York — **Data Communications: Effective Network Design.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Feb. 23-25 in San Francisco.

Feb. 9-11, Los Angeles — **Computer Controls.** Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Feb. 9-11, Boston — **Distributed Systems: Effective Approaches and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 9-11, Washington, D.C. — **DP and Word Processing Integration.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

Feb. 9-11, Chicago — **Effective Computer Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Feb. 25-27 in Atlanta.

Feb. 9-12, Santa Monica, Calif. — **International Symposium on Information Theory**, sponsored by the Institute of Electrical and Electronic Engineers. Contact: Professors Izhak or Kung Yao, Systems Science Department, 4531 Boelter Hall, University of California, Los Angeles, Calif. 90024.

Feb. 9-13, Chicago — **Fundamentals of Computer Systems and Analysis and Design.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Feb. 9-13, North Hollywood, Calif. — **Technical Symposium and Exhibit.** Contact: Society of Photo-Optical Instrumentation Engineers, P.O. Box 10, Bellingham, Wash. 98227.

Feb. 9-13, Los Angeles — **Reliability Engineering, Testing and Maintainability Engineering.** Contact: Dr. Dimitri Kececioglu, Aerospace and Mechanical Engineering Department, University of Arizona, Tucson, Ariz. 85721.

Feb. 9-13, Los Angeles — **Digital Filtering.** Contact: Continuing Education Institute, Suite 1030, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

Feb. 9-13, Washington, D.C. — **Databases for Minicomputers & Networks: Text, Data Image and Voice.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Feb. 10-12, New York — **Basic: A Computer Language for Managers.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Feb. 10-12, Chicago — **Innovations in Management,** sponsored by the Data Processing Management Association Education Foundation. Contact: Fundamentals in Responsibility Management, Inc., 1032 N. Lombard St., Oak Park, Ill. 60302. Also being held Feb. 10-12 in Toronto. Contact: Jackson-Smith Ltd., 56 Shepard Ave. W., Toronto, Ont., Canada M2 N1 M2.

Feb. 10-13, Dallas — **Microprocessor Software, Hardware & Interfacing.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

Feb. 10-13, Houston — **CICS/VS Logic & Debugging.** Contact: Online Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Feb. 10-13, Hartford, Conn. — **Designing On-Line Systems.** Contact: Hartford Graduate Center, Don Florek, 275 Windsor St., Hartford, Conn. 06120.

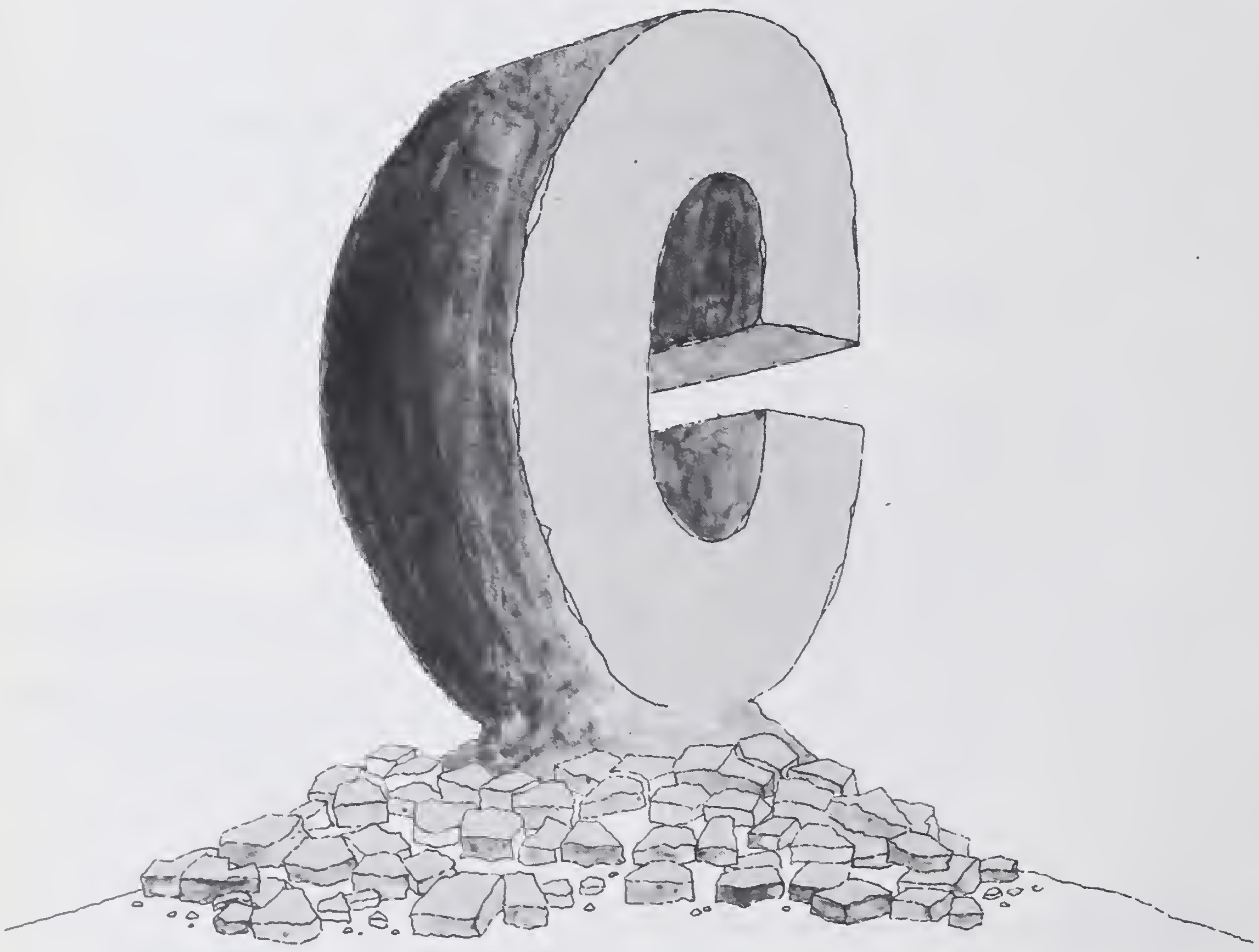
Feb. 10-13, Washington, D.C. — **Computer Network Design & Protocols.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

Feb. 10-13, San Francisco — **Vsam: Its Structure & How to Use It.** Contact: Online Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

Feb. 12-13, Cambridge, Mass. — **Distributed Systems.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Feb. 12-13, Orlando, Fla. — **Micro-Mini Computers, Personal Computer, & the Development & Evaluation of Educational Programs in Computer Science & Data Processing.** Contact: Association for Educational Data Systems, 1201 16th St. N.W., Washington, D.C. 20036.

Feb. 12-13, Boston — **Automated Office Documentation & Word Processing Support.** Contact: Carnegie Press, Center for Documentation Resources, 100 Kings Road, Madison, N.J. 07940.



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Feb. 14-16, San Francisco — **Fiber-Optic Communications Systems.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

Feb. 15-17, Jupiter Beach, Fla. — **Outlook for Video Systems.** Contact: Institute for Graphic Communications, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

Feb. 16-19, Rome — **International Operational Data Security Workshop.** Contact: Data Security Workshops, Inc., 6 Swarthmore Lane, Dix Hills, Long Island, N.Y. 11746.

Feb. 16-20, Washington, D.C. — **Computer Auditing.** Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Feb. 16-20, Montreal — **Structured Systems Analysis and Design.** Contact: Improved System Technologies, Inc., Floor 9, 888 Seventh Ave., New York, N.Y. 10106. Also being held Feb. 23-27 in Ann Arbor, Mich. and Dallas.

Feb. 17-19, Ottawa — **Digital Transmission and Switching.** Contact: Dr. Kamilo Feher, Prof. of Electrical Engineering, University of Ottawa, Ottawa, Ont., Canada K1N 6N5.

Feb. 18-20, Washington, D.C. — **Introduction to Teleprocessing Software.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 18-20, Washington, D.C. — **Computer Performance Evaluation.** Contact: George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

Feb. 18-20, Chicago — **Systems Analysis and Design: Concepts & Effective Practice.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Feb. 23-25 in San Francisco.

Feb. 18-20, Houston — **Systems Analysis and Design: Advanced Techniques.** Contact: Datapro Research Corp. 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Feb. 25-27 in Chicago.

Feb. 18-20, Sao Paulo, Brazil — **Data Entry Management.** Contact: Computercenter do Brasil Ltd., Caixa Postal 51674, Correio Haddock Lobo, 01000 Sao Paulo, Brasil.

Feb. 18-20, San Francisco — **Computer Crime Investigation.** Contact: Paul Shaw, Assets Protection Journal, Suite 503, 500 Sutter St., San Francisco, Calif. 94102.

Feb. 18-20, New York — **Data Base Management Systems: Concepts and Planning Guidelines.** Contact: Datapro Research Corp. 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 18-20, New York — **International Solid-State-Circuit Conference,** sponsored by the Institute of Electrical and Electronic Engineers. Contact: L. Winner, 201 Almeria Ave., Coral Gables, Fla. 33134.

Feb. 18-20, Boston — **Introduction to Word Processing: Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Feb. 23-25 in Washington, D.C.

Feb. 18-20, Los Angeles — **Word Processing: Effective Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 19-20, Cambridge, Mass. — **Demonstrating DP Department Performance to Non-DP Management.** Contact: Harvard University, Laboratory for Computer Graphics, Cambridge, Mass. 02138.

Feb. 19-20, Hartford, Conn. — **Management Skills for the Emerging DP Manager.** Contact: Don Florek, the Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

Feb. 22-26, Phoenix — **DP Performance Management Conference: Using Performance Management to Improve Productivity.** Contact: Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

Feb. 23-24, Merrimack, N.H. — **Material Requirements Planning: Techniques for Production and Inventory Management in the '80s.** Contact: New Hampshire College, 2500 N. River Road, Manchester, N.H. 03104.

Feb. 23-24, Washington, D.C. — **Data Communications: Advanced Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 23-24, New York — **Word Processing Implementation Workshop.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Feb. 23-24, Denver — **Records Retention and Files Management.** Contact: Thomas Wilds Associates, Inc., 516 Fifth Ave., New York, N.Y. 10036.

Feb. 23-25, Washington, D.C. — **Information Systems Planning: A Structured Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 23-25, San Francisco — **DP Personnel Management: Recruiting and Maintaining an Effective Staff.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 23-25, Minneapolis, Minn. — **Database Management: Objectives, Systems Functions and Administration.** Contact: University of Minnesota, 324 Business Administration Tower, 271-19 Ave. S., Minneapolis, Minn. 55455.

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College Centralizes Library, Computer Center

By Deborah Wise
CW Staff

POTSDAM, N.Y. — Clarkson College has centralized its information resource disciplines by putting its computer center, library and technologically assisted learning program in one building.

Clarkson College's $4 million Educational Resource Center (ERC), dedicated in October, "is not computer systems or library systems, but information systems generally. We believe there will be more information generated in our fields of specialization during the 1980s than in all previous history," said Dr. Robert Plane, president of the small, independent engineering, management and sciences college.

"New methods to store, retrieve, and handle this information will be essential. The educational resources system gives us the tools by which to derive these methods," he added.

The center runs an IBM 4341 mainframe with 4M bytes of main memory that supports a campuswide terminal network of about 100 terminals. Plans to put the library's catalog online are under way and Richard Valente, director of computing, hopes to use the computer to "centralize information resources."

Valente does not think the number of books on the stacks in the library can be increased above the 130,000 already there due to space limitations and therefore would like to put as much information as possible in the computer.

He explained that for engineering science research, a student often only needs to look at a few tables out of a number of books. Being able to call up that page rather than check out a pile of manuals would be useful and would save time.

However, Valente believes this process of putting textbooks on the computer will take time.

The first step would involve putting the material, mostly technical documents, onto microfiche. Then Valente hopes it could be put in machine-usable form for use on the computer, but he predicted this would take between five and 10 years.

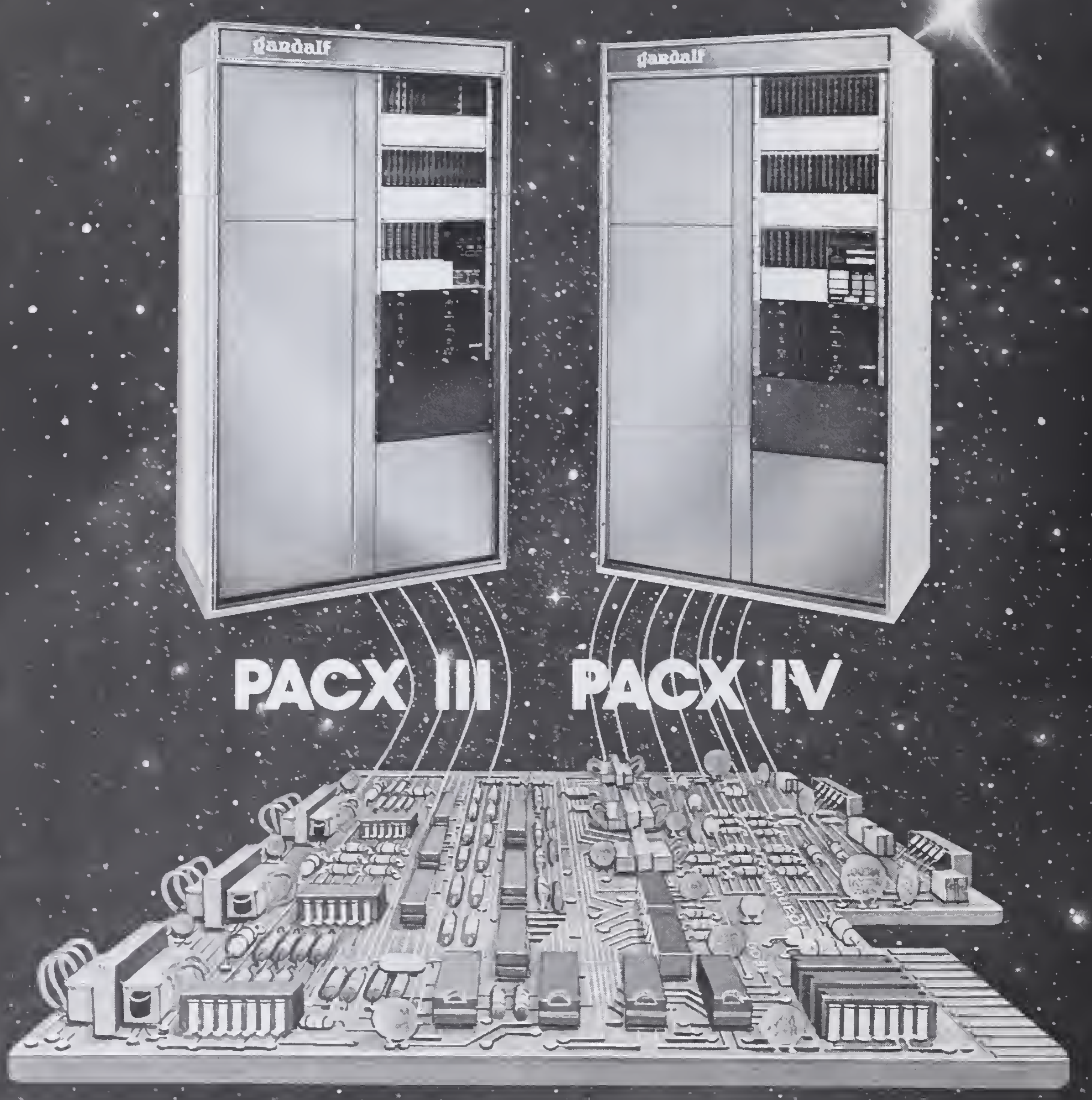
Education Function

Currently in use, however, is Clarkson's technologically assisted education function. This comprises a specially designed study area containing 20 carrels each equipped with video playback units. Lecturers can also use a lecture area with a computer port that projects a video display on a wide screen directly off a terminal.

Teachers prepare their own software programs to use the system and can graphically display examples to their students and then can vary parameters to answer specific questions brought up in class.

"The idea to bring together the information resource disciplines and to use computer technology in conjunction with them to meet growing needs was developed six years ago," Valente said.

At that time Clarkson's president and the board of trustees engaged nine industry consultants from such companies as Xerox Corp. and General Electric Co. to put forward plans. These were approved and an architect was engaged to complete the construction.



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Credible Performance at Low Price

Radio Shack TRS-80 Rises Above 'Toy' Image

By Hillel Segal
Special to CW

Radio Shack's most sophisticated small computer, the TRS-80 Model II, gave a very credible performance in benchmark tests conducted for the Association of Computer Users (ACU). Its performance in the real-life problems, which simulate actual customer applications, was slightly above average for the systems tested so far in the less-than-$15,000 price range.

ACU's independent consultants worked with the "Deluxe Business System," a version of the TRS-80 Model II which costs $8,017 in the complete package including desk. The price as tested, without the desk, was $7,648, making it one of the least expensive systems we have looked at.

Despite the fairly low cost, this was a complete system — less, of course, the applications software. The Model II as tested included three 8-in. diskette drives, 64K bytes of memory, printer, Basic language and operating system.

The TRS-80 Model II did well in the CPU test, oriented to math functions. Its times placed it near the top of the seven systems in this price range we've looked at so far. Results of the scientific/engineering problem, which involved numerical calculations and solved a set of simultaneous equations, were about average for the group. In the accounts receivable problem, the TRS-80 Model II's score was slightly above average.

Of course, the complete picture of all the systems' performances will emerge only after all 12 in this less-than-$15,000 series of tests — which we call Series 1 — are complete.

SCOREBOX

System: Radio Shack TRS-80 Model II
Current Price: $7,648

Series 1 Results**** Systems up to $15,000	**C-1** Scientific/-Engineering **Time**	**C-3** Accounts Receivable **Time**
Pertec PCC 2000	28:48.4	6:04.3
North Star Horizon	12:01.9	1:57.7
Cromemco System Two	14:52.6	2:48.0
Texas Instruments 771	22:05.4	3:38.1
Vector Graphic System B	19:30.0	5:56.5
Decstation 78	22:35.6*	5:04.8*
Radio Shack TRS-80 Model II	20:00.7	3:38.6

Series 2 Results**** Systems $15,000 to $25,000	**C-1**	**C-3**
IBM 5110	29:47.2	4:11.0
Wang 2200VP	2:05.8	3:20.0
Texas Instruments FS990/10	**	3:18.6
Hewlett-Packard System 45	4:38.9	5:05.8
DEC PDP-11V03	14:43.4	4:14.0
Q1 Lite	6:50.7	5:03.3
Univac BC/7-610	12:09.2	10:37.0
Northern Telecom 405	**	**
Datapoint 1170	38:27.5	6:50.4
Randal 100	13:52.4	10:05.0
Hewlett-Packard 250	4:05.9	4:45.7
Texas Instruments DS990/2	**	2:48.3

*Results include both compile and run time.
**Test could not be run because of memory limitations.
***Test could not be run because of formatting limitations.
****Both Series 1 and Series 2 were run on the same programs.

This is the 21st in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

Dealer Visit

The TRS-80's performance results in this series indicated that its low cost does not prevent it from solving problems as fast as its more expensive competitors. But what kind of software and support can you get with it? A stop at the local Radio Shack dealer was in order, to get behind the glossy photos.

The local Radio Shack dealership's computer display was located in a corner behind the stereos, car radios and TV antennae, next to some phonograph record-cleaning solutions. Nevertheless, for the small area it encompassed, it was impressive. Aside from the Model IIs, there were less expensive Model IIIs and the hobbyist-oriented Model Is and Color Computers. The Pocket Computer was also on display. If Basic is your language, Radio Shack offers a lot of choice at the low end of the cost scale.

It was apparent that Radio Shack is aware of the importance of software and is making great efforts to ensure that small business users and serious home users have at least something to work with. The 64K, single-disk versions of the Model II can be teamed with applications software for inventory management, general ledger, payroll, accounts payable and receivable, mailing list, word processing, filing and recordkeeping.

Expanding to three disk drives, as in the version tested, opens up the possibility of bigger applications packages. These are available for general ledger, payables and receivables. The Radio Shack software prices range from a low of $69 on up to $499 for the bigger packages.

Aside from Basic, which comes with the Model II on a diskette, 64K systems can run Cobol, Fortran, compiled Basic, and Assembler. A special program editor package is also available.

Obviously, Radio Shack would have a difficult time answering detailed queries from all its customers, should they be stumped by software problems. Store personnel might help with a few obvious bugs, but could not provide any extensive assistance. How, then, can Radio Shack keep all its end users happy, with upwards of 200,000 units in the field?

The answer seems to be the expectation that each user has at least a little bit of do-it-yourself in him. Radio Shack puts out more than a dozen books giving instructions on various aspects of computer use, from *Beginning Computers* to *How to Program the Z80*. Beginning programming classes were also being offered by the dealership we visited. The canned software, the instruction and the self-help books provide the support that Radio Shack offers users. Hardware maintenance is arranged through the local branch and a maintenance contract is available.

Such a level of support is entirely adequate for most hobbyist users and for more technically inclined business customers. The less sophisticated first-time computer user would be best served by adopting an available application program rather than trying to create his own software. The catch here is that available application programs are not always suitable to the specific needs of a business.

Forced to rely on outside programming, should the Radio Shack packages prove inadequate, one would have to evaluate conflicting claims and deal with more than one vendor at a time. While this does raise the complexity of computer ownership a degree, the good news is that the TRS-80 series is so popular that many suppliers of low-cost software can provide TRS-80 versions of their programs.

Perhaps the biggest caveat to potential buyers of inexpensive computers, such as the TRS-80, concerns the question of expandability. In the Model II, memory capacity is limited to 64K bytes and no hard-disk option is available, limiting on-line storage to the four-diskette maximum of 2M bytes.

While these are comfortable figures for home users and relatively small business applications, there is definitely a limit to the practical size of tasks such a computer can be given. Unless the manufacturer provides a path for further expansion, users may be faced with the necessity of conversion to another system after a few years of strong growth.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU is available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

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EDITORIAL

Time to Buy . . .

Chrysler may be offering rebates, but IBM is also now offering users incentives to purchase equipment.

During the past year IBM has been steadily increasing the lease and rental rates for most of its computer systems while holding the line on purchase prices or even reducing those prices, thereby making purchase the most attractive option for users who can come up with the money (see story on Page 1).

Almost all of IBM's equipment is now available at a purchase-to-rent ratio of under 30; i.e., it takes less than 30 months of rental to equal the purchase price of the equipment. This is the lowest purchase to rent ratio on a broad line of IBM equipment ever.

Clearly IBM is doing this in order to boost its own earnings over the short term since it makes more immediate cash from sales than it does from rentals — although it often makes more in the long run if users rent rather than purchase.

Users who can plan for their needs more than two and one-half years in advance — as all should be able to do — can then save a great deal of money by purchasing at the present bargain basement prices.

What keeps many from making such a move is the fear of technological obsolescence — the worry that IBM may outmode the equipment before its useful life is over. However, IBM is clearly committed to protecting user investment in software and, with a two-and-one-half year payback, this fear should not be as great as in the past, when it often took four years or more for the rental price to equal the purchase.

Therefore, even though the price juggling by IBM is clearly in its own interest, it is also in the interest of users who can now get most of the machines in the 3033 family at very low purchase prices when compared with the rental rate.

. . . If You Can

The sticker, of course, is the high price of money, caused by the Carter administration's maladministration of the economy in concert with the Democratic Congress.

It will be hard for many users to justify the purchase of computer — or any — equipment when interest rates are hovering around the 20% level — the cost of money is just too great for many firms to justify major purchases.

There is hope on the horizon, however. Interest rates have been coming down steadily over the past few weeks and it appears likely that this trend will continue.

In addition, tax reduction has been one of the keys for the incoming Reagan administration and, if a portion of that tax reduction is aimed at boosting capital expenditures, users may be in a good position within a few months.

All MIS directors should watch these developments closely. They should inform their firm's financial people of the excellent purchase opportunities available now — and work with them on the best timing for purchases of equipment they will need in order to fulfill user needs in the most economical way.

Although the times are troubled economically, there are many opportunities to be had by the forward-looking manager.

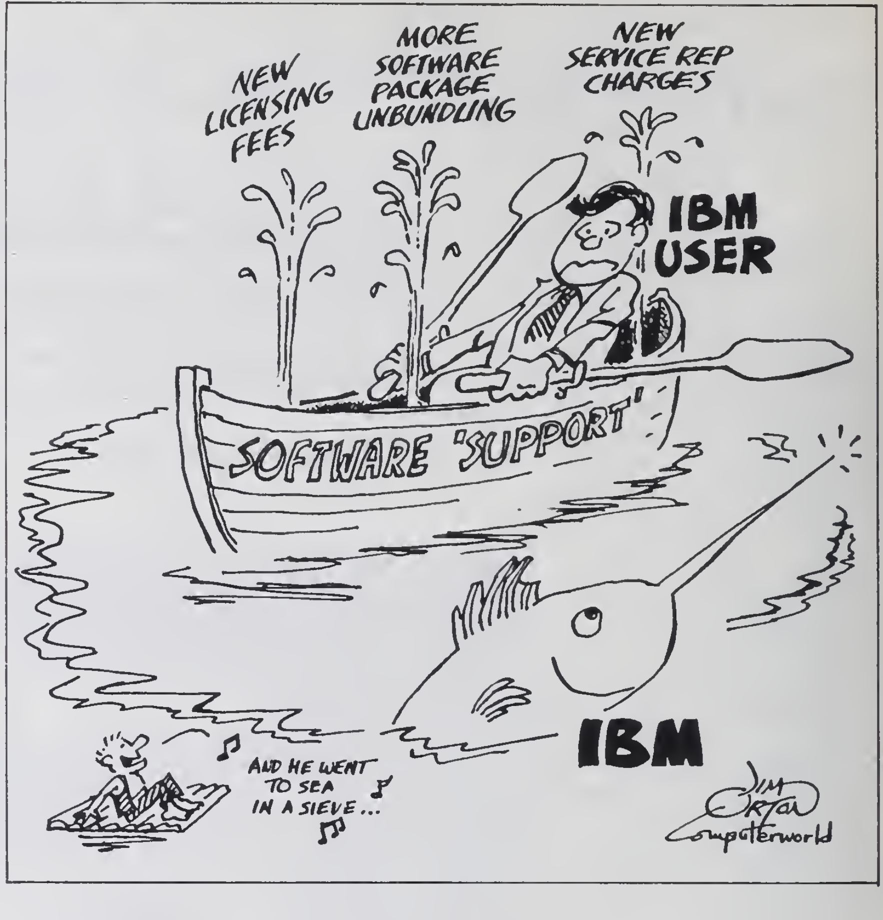
DATA PAST

Five Years Ago
Jan. 12, 1976

NEW YORK — Singer Co. joined the roster of ex-computer manufacturers. "The company has decided to withdraw over the next 12 months from the manufacture and sale of its Business Machines Division product line," Joseph B. Flavin, Singer chairman, announced.

Ten Years Ago
Jan. 13, 1971

Independent disk suppliers told users they were ready to improve on IBM's low 2319 disk configuration prices. The price changes announced by Potter Instrument Co., Telex Computer Products and California Computer Products were in response to IBM's pre-Christmas disk modifications.



LETTERS

Not 'a Weird Animal'

Thank you for the coverage of the recent Data Training '80 conference ["'TLC,' Education Diet Urged for Programmers," CW, Dec. 15]. I must, however, ask that a portion of the article be corrected.

The programmer is not "a weird animal." This phrase was not used in the session. He/she is an individual with personality factors that tend to be unique to our industry.

My respect for DP professionals is too great to let the phrase go uncorrected.

Terry H. Ebert
New York, N.Y.

Qualify Results

Computerworld's presentation of Datapro's Research Corp.'s "User Ratings of Proprietary Software" [Dec. 22] contained a misleading evaluation.

The four software packages which "stood out above all others" represented a small portion of total user responses. The package out of CW's "top four" with the most responses was rated by 14 users. Compare this with the 67 users rating Whitlow's Syncsort: the numbers suggest the likelihood that, were only 14 Syncsort users to be surveyed, the results might read quite differently.

While CW performs a public service in publishing survey results, evaluation of these results should be either supplemented with qualifying data (such as percent of *total* users of each package surveyed) or avoided altogether.

David Phillips
Rego Park, N.Y.

Confusing Advice

The recent "Extra" issue [Sept. 17] presented many interesting views. However, as a group manager in a large company, I am confused by today's conflicting, and somewhat illogical, advice from the "gurus" of DP.

Somewhat along the theme of R. Holland and others, J. Martin said we should stop the world and look at information needs in enough detail to translate those needs into data bases, then use high-level languages for operating on top of the data bases to maximize productivity. It is implied application packages may be out! Or at least, this is the interpretation of DP departments who operate under the premise that "it must be invented here."

D.D. McCracken, on the other hand, said: "Don't solve any problem that already has been solved." Example: buy utilities, application packages or otherwise get software that has the capabilities you need.

Further, Martin indicated that many systems are becoming too complex, yet in the next breath, he proposed approaches that are so complex they boggle the mind.

I agree we need to do a better job of planning in the systems area, and if we do plan, communicate, coordinate and cost-justify computer application within an organization, we will solve many of the problems of data base duplication and so on. However, I am afraid "paralysis by analysis" may cause many organizations to lose the future potential of personal computers, true office automation in the work place and the opportunity to eliminate the term "user" from systems slang.

The person(s) who can combine Martin's plea for planning with common sense and McCracken's summary of "Don't work harder than you have to, don't do useless work and don't do any work that has negative value" will be worth far more than the "gurus" who are only capable of "one pat speech" and general platitudes.

Donald R. Zuidweg
Kalamazoo, Mich.

(Other letters on pages 30 and 31.)

READER COMMENTARY/Henry J. Noble

A Case for Unionization

After reading the article about the Warner Bros. programmers' determination to leave their union [CW, Dec. 1], I thought I had better present the other point of view for them and for other readers.

I am working as a programmer-analyst at a medical research institution. Since April 1979, a number of my coworkers and I have been working to form a union here.

About three years ago, the programmer/DP staff of 10 people looked at union representation as a way of forcing management to keep our pay and training up with other Seattle-area organizations. However, we quickly realized that the administration, which only recognizes as "persons" those individuals with M.D.s and Ph.D.s, would give our small group short shrift.

For the last year and a half, we have been organizing with the laboratory technicians, secretaries, animal technicians and glassware technicians to form a 300-person bargaining unit under National Labor Relations Board (NLRB) rules. Our executive committee (of which I am proud to be a member) is representative of the different work areas and the union is, consequently, well versed in the way our institution is (mis)managed and what needs to be done to bring about changes in pay and working conditions.

"Hang together or we'll all hang separately" became a serious motto after management tried to fire one of our leaders for organizing. I personally have been in the computer field for 20 years and unionized for nearly half of that. I've worked for private companies, job shops, state governments and universities, and the only time I've been called a "professional" is when my boss wanted me to work weekends or after hours without pay.

No Different

If the Warner programmers think they are different from the other workers, they are very wrong. If management has made promises about better deals if they leave the union, then they had better watch out! Management will take back those better deals soon enough.

If the union wasn't meeting the programmers' needs, what did they do to change it?

Unionizing provides job protection from summary firings, from harassment and from being jumped over for promotion. It provides the means for upward mobility and fair compensation. It provides the means for dignity and respect on the job and the room to do a good job in a "professional" manner without being exploited unreasonably.

Our organization shopped around, interviewing a number of unions before we decided to remain an independent industrial-type (as opposed to craft) union.

I think anyone who is fooled into thinking that the best working arrangement can be made one-on-one with the boss is, frankly, crazy in these times.

Furthermore, our president happens to be a data control clerk. She's the toughest, most dedicated president I've ever worked with. Enough of programmer "elitism." Please.

Noble works at the Fred Hutchinson Cancer Research Center in Seattle.

THE TAYLOR REPORT/Alan Taylor

Why Not Have Two Cobols?

The new independent and transportable Cobols that have been covered here during the past year all use pseudocodes. But the ways in which they use them differ so drastically that DP departments have had trouble evaluating them. Some readers have asked for more information and, in particular, some way to grade such codes.

In fact, to users, the key importance of the pseudocode depth in a particular Cobol or other language relates to the language's potential compatibility with other operating environments and application programs. There is no straight advantage or disadvantage.

It is simply not possible to put a grading on the pseudocodes used and say that Cobol A is better than Cobol B because it uses a pseudocode that goes deeper or is more sophisticated.

Microsoft, Inc.'s Cobol-80, for example, uses a fairly primitive pseudocode [CW, May 5, 1980] which fits in with the needs of efficiency and with a particular operating system. So, on the surface, does CAP-CPP, Inc.'s Microcobol.

But there is a difference — the Microsoft operating system, while transportable across hardware, is traditional in the sense that Microsoft sells Fortran and other compilers that operate in the same environment. CAP-CPP offers a self-contained environment that has only one language facility. Sometimes an installation will only need such a facility — but sometimes more languages and support systems are needed.

Not as Deep

By contrast, the pseudocode used by RM-Cobol [CW, Nov. 3] goes much less into the depths of the system. It consists of definitions of Cobol statements that are more like a concentrated version of the procedure division. In this technique, the user gains an ability to hold large Cobol programs in concentrated form.

Moves, for instance, would take up six bytes and consist of a Load, Add and Store. However, the actual operand would not be directly identified; instead, just the Data Pointer that identifies the operand location is described. At runtime, this description would be examined to determine sizes, formats and so forth and all necessary editing would be performed based upon these.

Mike Saccomano of Ryan-McFarland Cobol estimates that four or eight bytes holds most normal Cobol statements, which has a distinct value in itself. In addition, moving the Cobol compiler concerned across different operating environments may be easier when functional pseudocodes, rather than machine-functional ones, are involved. Certainly RM-Cobol now appears to be moving into newer and less restricted operating environments than either of its rivals.

Watch the Environment

However, when a Cobol can move between operating systems freely, the performance statistics become muddied. Currently the use of different operating systems under the same compiler and on the same hardware is producing two-to-one differences in performance!

With performance variations like this, user movement between operational environments has a price tag as well as an advantage. Similarly, the use of lower level pseudocodes with their lower level tie-in to hardware and more restricted range of compatible software also has costs to be weighed.

However, the two major groups have something in common — the area that now comes into focus is the value *to the users* of their own current (and potential future) hardware and software environments.

A user preparing to select a transportable Cobol or to accept any nontransportable or traditional Cobol should determine how much he knows about his future operating environments.

There are some things he probably won't know, such as the hardware to be used. Not having to take a stand with a particular piece of hardware is the key advantage of transportable Cobols. But the user often *will* know whether the system will always be dedicated to Cobol applications or whether additional languages will be needed.

And he should have a good idea as to what degree of multiprogramming will be expected, what communications

(Continued on Page 30)

READER COMMENTARY/Henry Pikner

What Does Time Mean to a Chip?

The following joke appeared in an English reader I once used: A city cousin visits a pig-raising farmer. The farmer describes all the modern equipment and procedures that make the pigs happy. Asks the visitor: "Why do you go through all that trouble?" The farmer: "The hogs grow faster." The visitor: "What's time to a hog?"

The joke always comes to my mind when someone calls for higher programming productivity *because* we have faster chips, as J. Daniel Couger seemed to be doing in his Dec. 1 column. Here is my "half-asked" question to Couger: What's time to a chip?

Couger introduces ratio P/C, with P, the time a programmer needs to write an instruction, over C, the time a computer needs to carry it out. He observed that in recent years, C has gone down much faster than P, pushing his ratio through the roof. Ratios should not go through the roof, so let's reduce P by calling for increased programming productivity. That will be achieved mainly by "redesign of motivational environment." So much for a summary of Couger's ideas, not always quoted accurately.

Here is a pair of instructions: J:=0; DO I:=1 UNTIL J=5. These took me 30 seconds to write (P) and will take 999999999 years to execute (C) even on the fastest computer four generations from now. What a breakthrough — we have pushed the ratio down to zero. However, the program does nothing useful.

I do agree with Couger that programming productivity could be increased and that the right motivation might contribute to it. Nevertheless, I feel this is not the main issue. The late Maurice Halstead showed that work output of an isolated programmer cannot be raised beyond the limit determined by the programmer's Stroud number, which lies somewhere between five and 20 elementary discriminations per second (Halstead uses value 18 in examples). I accept Halstead's deductions and conclude from them that the only valid question concerning productivity is: How can the productivity of a programming group be increased? That depends, above all, on the quality of the management of the group.

The following is an incomplete list of some things good programming management should do:

1. Choose for the group a programming language with the highest level available. Halstead showed that a higher level language leads to shorter programming time, shorter programs and fewer errors. Use nonprocedural languages where possible.
2. Build libraries of reusable code. Bob Lanargan of Raytheon Corp. has published data showing that some 40% to 60% of code in programs is redundant. So it would seem to make good sense to build such libraries. In Halstead terminology, this would increase the level of programming languages that can use the libraries.
3. Standardize; use the Ten Commandments as a model.
4. Use systematic administration of

(Continued on Page 30)

LETTERS

Got the Facts

In reference to the letter "Getting the Facts" [CW, Dec. 15], with all due respect to Dan Warner, I think the intention of my article "A Zip Solution" [CW, Nov. 24] was misunderstood.

If there had been research and investigation of the facts, there would have been no need for the article. The article was based on assumptions of how a solution could be achieved prior to getting the facts.

However, Warner's advice was well taken, and I contacted the U.S. Postal Service in Washington and discovered as of October 1980, the facts were preliminary and proposed insofar as file description was concerned.

As far as record, block and file size and tape density are concerned, any programmer worth his salt can handle those facts as received.

Computerworld should be congratulated for allowing both comments to be printed.

Domenick Flotta

Harrisburg, Pa.

Unfounded Allegations

I agree, in essence, with the comments of Norma Horton and M. Bernstein [CW, Dec. 22] regarding sexist advertisements. Hopefully, the negative responses generated will persuade *Computerworld* to refrain from accepting such advertisements in the future.

However, I must report that Bernstein was seriously mistaken about the pictorial content of *The American Rifleman*. To be sure, there are usually several photographs featuring women — target shooting, receiving awards and holding trophies for marksmanship.

I certainly have never seen depictions of humans one would consider sexist.

I would suggest that unfounded allegations serve to weaken basically reasonable arguments by giving opponents a fallacy on which to base rationalizations.

Mark Diaz

Westmont, Ill.

Why Not Have Two Cobols?

(Continued from Page 29)

protocols will be wanted and how large the programs can be. These requirements can be compared with the support available from the Cobol vendor or from other vendors in the compatible areas.

Given a description of user needs in these terms, the advantages and disadvantages of different offerings can be fairly considered, despite differences in pseudocode implementation methods. As I said at the start, pseudocode design differences cannot be brought down to any specific numerical merit value; they have to be looked at from different angles. The environmental outlooks are the first and most obvious things to look at, but they are not the last, by any means.

Why Not Two?

The real surprise comes in checking out the costs, after the environmental review. This turns out not to be the normal "A" or "B" review. With transportable Cobols, the prospect of having *two* Cobols, both with their own particular advantages, becomes a real alternative.

This currently applies particularly to RM-Cobol and Cobol-80, both of which do follow the U.S. standards. (CAP-CPP tells me its system can be made compatible with the U.S. standards with either a precompiler or manual conversion, particularly if in the original writing of programs the limitations of Microcobol are taken into account. This would mean, for instance, use of one line per statement, handling of record processing in working-storage rather than in file sections, use of subscripting, avoidance of indexing and of arithmetic expressions in condition statements and so on.)

Is the idea of a DP department having two Cobol compilers, both of which are transportable, really strange? Or is it something that will be regarded much as having two sort systems or two operating systems is now? As far as I can tell, nearly all users are looking forward to running multiple pieces of hardware or are already doing so. It is valuable to be able to choose at the last possible moment the compiler that best suits a new piece of hardware. At that point, the user has a full understanding of the application.

The price structures for the transportable Cobols certainly make having two one of the cheapest luxuries currently available to DPers.

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What's Time To a Chip?

(Continued from Page 29)

data.

5. Use systematic administration of production programs.
6. Train the staff.
7. Provide fast delivery of outputs from compiles and test runs, either by creating an on-line shop with suitable terminals or by setting up remote job entry stations close to the programmers.

As for motivation, programmers will motivate themselves in a group whose leaders create a productive environment, make timely and consistent decisions, formulate goals clearly and say "Thank you" if programmers deliver (or "Good-bye" if they don't).

Pikner is a technical specialist at a New York City bank.

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LETTERS

Nonsexist Sports

I would like to rebut M. Bernstein's "Blatant Sexism" letter.

It is quite obvious she knows not of what she speaks. Unless things have changed drastically, I believe you run ads the way they are submitted to you, or refuse to run the ad if you feel it in poor taste.

It is also obvious she has never cracked the cover of the *The American Rifleman*. I have yet to see a questionable photo of sportsmen, male and female, in it or in any other publication by the National Rifle Association. Hunting and shooting sports are probably the most unbiased and nonsexist that can be found.

H. Keith Swigart
Yellow Springs, Ohio

Glaring Misconceptions

I am amazed at the degree of misinformation Robert Davis conveyed in his "Where Have We Gone Wrong In DP?" [CW, Nov. 17]. If I were to comment on everything that was incorrect, it would probably take up as much space as Davis' article.

The most glaring presumption throughout his discussion was that all of top management is enlightened. I have found an amazing degree of incompetence at that level in the many companies for which I've worked. Combine this prevalence of ignorance with the subtitles of political games and it becomes a matter of sticking one's neck out to accomplish any objective. Most of them are "too busy running the company" to want to understand or communicate with DP people.

Unit record equipment was capable of producing very sophisticated procedures that would be considered major projects on today's computers. Davis' comment that systems analysts were not required was a regrettable inaccuracy.

As for his observations regarding the first generation of computers, the DP manager was the programmer, system analyst and general manager of the entire DP function. Even today's ads for managers of small installations require these efforts.

The introduction of RPG in second-generation computers was not "a duplication of the unit record function." Davis' reference to magnetic tape, core storage and disk (not mentioned) obviated this statement. RPG was intended to produce reports quickly from existing files, not handle the input, editing or placement of data.

In most cases, I have gotten at least one of the following responses to my efforts in trying to communicate with top management:

1. What do you know? You're not an accountant.
2. You are DP; you are not part of the actual company.
3. You've been hired to do as you're told and we can tell you.
4. Just duplicate what you see being done and make no changes.
5. Don't tell me about better ways or costs, just do what you're told. I know the company and you don't.

I wish I had a buck for every piece of managerial garbage I've had to swallow in the form of computerized nonsense.

In my experience, I have found that DP is not given a respectable place in the business community. It is labeled a "service department" and is subject to the whims of whatever powers prevail in the company.

And it is easy for executives to shirk their responsibility for assuring the proper use of equipment by loudly proclaiming their lack of understanding. Efforts to get them to attend good familiarization seminars are in vain because they're just too busy. I predict that they will be found out (not by the Davis type of article) and they will rush to understand and communicate. They might even give us DP guys a break and read a proposal or feasibility study to lend their knowledge and support to projects.

Davis' display of the "Historical Development Of Information Systems" was full of inaccuracies. For example, there were many successful on-line, real-time systems running on first-generation (that is, 1401) computers.

Based upon his article, I would highly recommend that Davis talk to some good DP people who have been in the field for a while. He might learn some valuable stuff that he can pass along to top management.

Name Withheld by Request

A Constant Battle

I would like to respond to the letter from E.G. Johnston [CW, Nov. 10] wherein the question was asked, "What has color or sex got to do with computing?" The answer to that question is, of course, "nothing."

Unfortunately, however, racist and sexist attitudes are not unknown in the world of computing. Groups like Black Data Processing Associates and the Association of Women in Computing exist to provide support to their members who may be caught in racist and/-or sexist situations at work and who need guidance in dealing effectively with such situations.

On the employment scene, minorities and women fight a constant battle to be accepted and judged for what they are and what they do, not for what they are prejudged to be — to keep the focus on work performance and divert considerations of sexual and ethnic differences to more germane occasions.

Like his (her?) friend at the science fiction convention, Johnston mistook the symptoms for the disease.

Martin C. Coke
Columbus, Ohio

On March 18, 1981 *Computerworld Extra!* will devote an entire issue to an in-depth look at "Communications Systems in the 80's."

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Computerworld Extra! is an extra issue of Computerworld — the second we have done — to be published this March 18th. It will appear in what our Editor, Drake Lundell, calls a "tabazine" format. This means glossy, full-color covers on the outside, and a magazine format inside (printed on super calendared newsprint) — and tabloid-size throughout.

This issue of *Computerworld Extra!* will focus its entire editorial content on a single subject: "Communications Systems in the 80's." Top experts from all areas of the communications field will write magazine-length articles on a variety of topics including: Integrating Voice and Data Networks; The State of Videotex in the US, Uk, France, and Canada; Network Management; Satellite Technology in the 80's; The Past and Future of the Communications Act and Federal regulations; Network Standards and Protocols; and Future Directions in Telecommunications Technology. Plus, there'll be Wrap-up and Analysis articles for Data Communications Software, Data Terminal Equipment, and Data Communications Equipment.

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Distributed Processing Equipment	28	17,900	18	45,000
Computer Services and Timesharing	26	16,600	20	50,000
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Source: "A Profile of Computerworld Subscribers and their Companies" — Becker Research.

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OFFICES AROUND THE WORLD

Among Three Products in Works

MPG to Offer TP Monitor for OS, DOS

By Rita Shoor
CW Staff

PRINCETON, N.J. — Mathematica Products Group (MPG) here will be offering a teleprocessing (TP) monitor that works under OS as well as DOS-type operating systems. That was the first of the details made available on software product development to MPGSwift users at recent meetings.

Three products — code-named Atlas, Titan and Hermes — are currently under development, the company spokesman said.

Atlas is a multitasking TP monitor that functions with Release 2 of DOS/VSE and all current releases of OS/MVS. Described as a "different generation of software" from the firm's MPGSwift TP monitor, it utilizes the DOS/VSE Release 2 subtasking macros to accomplish its monitoring functions, according to Tony Crosta, manager of MPGSwift engineering.

This means that Atlas is integrated within the operating system rather than having the monitor act as a second operating system, he explained. Because the product is still under development, no benchmark figures were available. However, MPG claimed that this integration would cut down on system overhead and provide "better response time."

Atlas processing activity fully overlapped with I/O activity and application programs use the standard call interface to request services from the monitor, a spokesman said. Multiple save areas can be specified on disk or in main memory and application programs can nest subroutines with memory allocated dynamically to meet changing needs, he continued.

MPGSwift, the Atlas predecessor, will continue to be offered to those installations where a single-threaded monitor meets all necessary requirements and a migration path between the products is also available, Crosta pointed out.

Priced at $28,000, the DOS/VSE version is scheduled for November release. The release data for the OS/VS version will be announced in September.

Titan Software

An on-line interactive programming system that will supersede MPG's Terminal Interactive Programming System (Tips) software, Titan runs with either the Ramis II data base management system (DBMS) or in an Atlas environment.

In either case, Titan provides a full-screen editor, library facility and security system and also provides an operating system interface for job submission and retrieval under Atlas, according to a firm spokesman.

Allowing for the terminal screen to be logically divided into a maximum of four windows, each window can be dynamically assigned for viewing and editing data, program files and job input or output, he said.

Data, programs and JCL are maintained as files in an integrated library facility that can reconstruct up to 255 earlier versions of a given file, he claimed. The operating system interface provides for job submission, monitoring during execution and output retrieval when execution is complete.

When used as an optional Ramis II feature, Titan allows the user to develop and edit online English-like nonprocedural records management and report generation requests against either Ramis II files or extermally stored files, he said.

A DOS/VSE Power version of Titan is planned for release in November for $12,000. Information about the release date for the product in a Ramis II environment will be available in May and the release date of the OS/VS version will be coordinated with the release of Atlas in an OS environment, MPG said.

Hermes Announcement

Hermes, the last in the announced series, had no predecessor in the MPG product line.

(Continued on Page 36)

Primos Operating System Gets Command Procedure Language

NATICK, Mass. — Prime Computer, Inc. has unveiled Command Procedure Language (CPL), calling it a major enhancement to Primos, the operating system for the vendor's 32-bit 50 series systems.

The language allows sequences of Primos commands and CPL directives to be stored in a command procedure file which can be executed by specifying the file name, the vendor claimed.

CPL directives provide for the passing of arguments into command procedure files for statement execution order control within the files and for error handling, a spokesman said.

The user can thus combine a number of complex steps into a single command, eliminating the need for repetitive typing of long command sequences.

The language comes free of charge as part of Primos, the vendor said from Prime Park, Natick, Mass. 01760.

Handles Spool Output

CICS Users Gain Printing Aid

DALLAS — A package for the direct printing of spool output on hard-copy terminals running in IBM CICS environments has been introduced by Information Concepts, Inc.

The package, CICS Print Management System (CPMS), offers a $DN display of the output queues to determine the availability of the spool output; a spool display function from any CICS terminal to review the output for completeness and validity; and routing facilities that simulate Ansi print control on CICS printers.

CPMS is available for VS1, JES, JES2 and JES3 systems with CICS Versions 1.1 through 1.5. The product runs as an auxiliary task under CICS to eliminate interference with the coexisting production or test CICS system.

CPMS supports printers under Btam, Tcam and Vtam (DSC mode). SCS print control simulation is scheduled for the end of the first quarter.

Once a user has located and verified his output, CPMS provides printer status diagnostics, print control overrides, start, restart, cancel, reposition and purge commands, its vendor said. Commands allow output to be alternately sent to JES for normal printing or routed to specific queues as-

(Continued on Page 36)

Program Displays CICS/VS Status

MADISON, Wis. — A program that displays system status and statistics for CICS/-VS is available from Klein Diversified Enterprises, Inc.

Stix provides the capability to check on terminal status, terminal usage, programs in PPT, transactions in PCT, transaction usage, files in FCT, file usage and file status, the vendor claimed.

The program runs under CICS 1.3, CICS 1.4, DOS/VSE, DOS/VS, OS/VS1 and MVS. The source code and documentation are available for $500. The vendor is at 2001 W. Beltline Highway, Madison, Wis. 53713.

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Package for IBM System/38 Has 13 Application Modules

OAK BROOK, Ill. — Professional Computer Resources, Inc. has introduced an application software package for the IBM System/38, the Resource Management System (RMS/38).

RMS/38, a fully integrated on-line system for manufacturing and accounting operations, is a framework of 13 application modules addressing specific management functions, its vendor said.

Modules include inventory management, product structure, material requirements planning, production control and costing, forecasting, capacity planning, order entry, billing, accounts receivable, sales analysis, accounts payable, general ledger and payroll, the vendor explained.

The RMS package, previously available to IBM System/34 users, was modified for the System/38.

Individual modules cost between $4,000 and $8,000, and all 13 modules cost $60,000, the vendor said from 2021 Midwest Road, Oak Brook, Ill. 60521.

Program Does Accounting

PENSACOLA, Fla. — Digital Systems of Florida, Inc. has added a Financial Statement Generator Program to its library of software applications for the professional accounting marketplace.

Designed for the company's Client Accounting System, it assists Digital Equipment Corp. PDP-11 users in formatting balance sheets, income statements, supporting schedules and fund reports. Vertical control and greater horizontal control are also reportedly possible.

The program comes as part of the company's PDP-11 turnkey system or it can be purchased for an already existing system for $500. Digital Systems of Florida is at 114 E. Gregory, Pensacola, Fla. 32501.

Account-Monitoring Tools Detect Potential Problems

ORANGE, Calif. — TRW Business Credit Services is offering four computerized account-monitoring services designed to assist credit executives in the early detection of potential problem accounts.

The services, called Asset Control Techniques (ACT), are available only to those companies that contribute accounts receivable information to TRW. ACT is an on-line, time-shared service.

The Update service reviews the paying habits of a contributor's existing customer base according to criteria the contributor selects and produces a business credit report on each of the accounts in question.

A service called Alert produces a list of a contributor's accounts that have an unfavorable payment condition. Included on the list are the name and address of the company, degree of delinquency and a number the contributor can use to order a report.

Signal identifies potential problem accounts in a list format, triggered by recent inquiry activity and delinquent payment performance.

It also includes the company's name and address, the degree of delinquency and a number for ordering reports, the vendor explained.

The Monitor service monitors existing accounts' payment practices and produces a business credit report on each of the accounts that meets the contributor's criteria.

Charges for the services are based on the number of accounts and whether the user is a member of the National Credit Information Service, TRW said from 505 City Pkwy. West, Orange, Calif. 92668.

MPG Working on Monitor

(Continued from Page 33)

Designed to provide complete screen-handling facilities, Hermes allows the program developer to develop the entire screen format at the terminal and modify it until specifications are met, according to MPG.

Once the screen has been formatted, skeleton source code is generated with data names and other optional attributes via a subset of the Titan full-screen editor, a representative said.

The system then generates a field mapping table that provides the linking information required to transfer data between screens and the data fields of the application program at execution time, the representative added.

Application programs are said to be totally independent of the terminal hardware and can be invoked from any 3270 terminal supported by the Atlas system.

Hermes is scheduled for release in March 1982 at a cost of $8,500. Additional information is available from MPG through P.O. Box 2392, Princeton, N.J. 08540.

Package Directs Spool Output

(Continued from Page 33)

signed to remote job entry activities.

For MVS users, CPMS includes a queue "clean-up" command, which is said to automatically purge all output remaining in queues more than "nn" number of hours with more than a specified number of lines.

The introductory price for CPMS is $3,600 through March 31 and includes source libraries, installation documentation, maintenance for 12 months and telephone consulting during installation. The firm can be reached at 8314 San Leandro Drive, Dallas, Texas 75218.

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System/34 Gains WP

SPARTANBURG, S.C. — RB Software, Inc. has announced a Program Documentation Aid and Word Processor (WP) for the IBM System/34.

The Program Documentation Aid is said to produce comments lists for OCL and RPG, job outlines of menus up to 16 levels, job outlines of procedures up to 16 levels, procedure cross-references and RPG cross-references.

The Word Processor system reportedly allows unlimited insertion of variables for data merging.

Each package costs $600 from the firm at P.O. Box 6308, Spartanburg, S.C. 29304.

System/34 Tools Aid Publishers

MILWAUKEE — Harris Data Service, Inc. is offering a Dealer Order Processing System and a Subscription Fulfillment System for publishing houses using IBM's System/34.

Designed with the aid of Ideals Publishing, Inc., both packages are available under purchase time-payment plans.

The Dealer Order System costs $12,500 and the Subscription Fulfillment System costs $6,500, the vendor said from 11629 W. Dearbourn Ave., Milwaukee, Wis. 53226.

'SYS/34' Cobol Compiler Translates for OS, DOS Use

BUFFALO, N.Y. — An ANS Cobol-to-System/34 Cobol translator for IBM DOS and OS users has been announced by Dataware, Inc.

Since the SYS/34 Cobol compiler adheres to the 74 Cobol standards, according to a Dataware spokesman, the conversion involves large-scale Cobol 68 to small-scale Cobol 74.

Because it is IBM-to-IBM, the syntax and logic structures are similar, but those items no longer supported are deleted by the package and flagged for manual reworking, he explained.

The software can be licensed for an annual fee of $4,800 including documentation and maintenance. The firm offers conversion services as well, the spokesman said from 2565 Elmwood Ave., Buffalo, N.Y. 14217.

DTSS Adds Timekeeping Package To Interactive Computing System

HANOVER, N.H. — DTSS, Inc. is offering TKSYS, an interactive timekeeping and reporting system, as part of its interactive computing system.

The system was designed to help professional services firms keep track of time. It enables such companies to focus on profitability by tracking how much time is allocated to their various clients and contract activities, the vendor claimed.

The package can be accessed through the firm's computing service by retail customers or members of the DTSS Associates Plan, or it can be licensed directly from Lupfer & Long, Inc.

The package costs 11 cents per Computer Resource Unit (CRU) for retail customers, 5.5 cents per CRU for associates and $5,000 for a one-time license fee, DTSS said from 10 Allen St., Hanover, N.H. 03755.

Radio Shack Offers Agribusiness Marketing Information Service

FORT WORTH, Texas — Radio Shack has entered into a joint agreement with Professional Farmers of America to provide the agriculture industry with its first electronic marketing information service.

The Instant Update service provides farmers and agribusinesses with immediate access to the market events that affect commodity prices, crop yields and other data important to improving farmer's business activities.

Instant Update will be transmitted via telephone lines to Videotex terminals specially made by Radio Shack for the program. The terminal utilizes standard telephone lines and a standard television set to receive and display the information 24 hours a day.

The Professional Farmers of America's version of the Videotex terminal contains 16K bytes of memory that allows up to 32 screens of information to be stored for instant user recall and analysis, according to Radio Shack.

The TRS-80 Model II was chosen as the connecting link between the central data base and the information user.

The daily program is scheduled to begin March 2, and cost will vary according to usage. Radio Shack, a division of Tandy Corp., is headquartered at 1800 One Tandy Center, Fort Worth, Texas 76102.

Q.E.D. Issues Guide To Codasyl DBMS

WELLESLEY, Mass. — Q.E.D. Information Sciences, Inc. is offering a book by Robert Perron, *Guide for Codasyl Data Base Management Systems*, for data base administrators and systems analysts working with the Codasyl DBMS in a mainframe operation, as well as those using minicomputers, the publisher said.

The book provides a detailed review of concepts of architecture, logical structures and access mechanisms.

The book costs $29.50.

Q.E.D. Information Sciences is located at 180 Linden St., Q.E.D. Plaza, Wellesley, Mass. 02181.

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Productivity Courses Aimed At Programmers, Managers

SANTA MONICA, Calif. — Interactive Systems Corp., a supplier of Bell Laboratories Unix-based systems, is offering seminars from Jan. 26 through Jan. 29 to help customers maximize their systems' productivity.

The three-day programmers seminar will be an overview of how Interactive's systems can be used for document and program management and control and general computing. The fee is $350 for a single attendee, or $275 each for two or more attendees from the same company.

The one-day system management seminar will cover the necessary topics for successful management of Interactive's Unix-based operating environment under the VAX/VMS operating system.

The fee is $50 for those also attending the programmers' seminar and $100 if attended alone.

The courses, which will be held in Santa Monica, will close when 25 students enroll. The company can be reached at 1212 Seventh St., Santa Monica, Calif. 90401.

On Configuration Management

DPMA Plans Seminar

LOS ANGELES — A two-day seminar entitled "Software Configuration Management" will be conducted in San Diego on Feb. 9-10, in San Francisco Feb. 12-13 and in Los Angeles Feb. 26-27 by the Data Processing Management Association's (DPMA) Education Foundation.

The seminar will feature H. Ronald Berlack of Sanders Associates, Inc., who will offer an in-depth presentation on the planning and implementation of software configuration management disciplines in both large and small organizations and on key software projects.

Admission to this conference is $425 per person, $405 for DPMA members or $360 for groups of three or more, military, federal or university people, a DPMA spokesman noted.

Additional information on the forthcoming event is available from EF-DPMA Seminars, Department SCM, P.O. Box 91295, Los Angeles, Calif. 90009.

'ASDM' Enhancements Improve Analysts' Productivity by 40%

CINCINNATI — M. Bryce & Associates (MBA) has unveiled enhancements to Automated Systems Design Methodology (ASDM), its software tool for the specification, analysis, design, development and implementation of information systems.

The system runs on several computers, including those made by IBM, Honeywell, Inc., Hewlett Packard Co., Burroughs Corp., Sperry Univac, Digital Equipment Corp., Amdahl Corp. and ICL, Inc.

The release can improve analyst productivity by 40%, the vendor claimed. In addition, it provides a computer-aided design tool for systems development.

Using it, analysts can model and design applications with the computer, a spokesman said.

The ASDM package costs $80,000, the vendor said from 1248 Springfield Pike, Cincinnati, Ohio 45215.

'Psam' Supports FBA Disk Drives

BROOKFIELD, Conn. — Universal Software, Inc. has announced that Psam, its alternative access method to Isam and Vsam for IBM users, now supports fixed-block architecture (FBA) disk drives operating in native mode.

Previously, IBM users running DOS/VSE on a 4300 series CPU with 3310 or 3370 disk drives could use Psam if the disk drives were emulating 360 or 370 count key data (CKD) disk drives, a spokesman said.

Only FBA users already operating in native mode could not use Psam, he said. Psam, which runs on DOS, DOS/VS(E), EDOS (VS), DOS/MVT and DOS/RS, is available for a free trial and rents from $340/mo from the vendor at Brookfield Office Park, Rt. 7, Brookfield, Conn. 06804.

'Two' Converts OS JCL to TSO

WABAN, Mass. — A conversion function which reportedly transforms IBM OS JCL programs into IBM TSO Command Procedures or vice versa is available from Tanit Co.

Two is used to quickly change job control languages so the user may use computer programs in a more favorable environment, the vendor claimed.

Included in the conversion service are cross-reference listings, conversion error reports and other conversion information, Tanit said. It can be reached through P.O. Box 191, Waban, Mass. 02168.

DOS Version Offered Of Johnson's 'Alarm'

McLEAN, Va. — Johnson Systems, Inc. is offering a DOS version of its hardware maintenance monitoring package, Alarm.

DOS Alarm offers data center managers information to implement and control a dynamic program of maintenance management, Johnson said. The package "accesses, massages, analyzes and displays data" from Logrec and historical files in readable management reports, a spokesman added.

DOS Alarm costs between $3,000 and $8,000 depending on CPU size, the vendor said from 7923 Jones Branch Drive, McLean, Va. 22102.

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Squeezing more throughput from your virtual system is a complex challenge. STC has a straightforward answer: Balance your virtual I/O with the correct combination of main memory and high-speed paging store.

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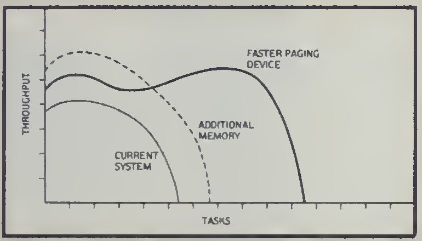

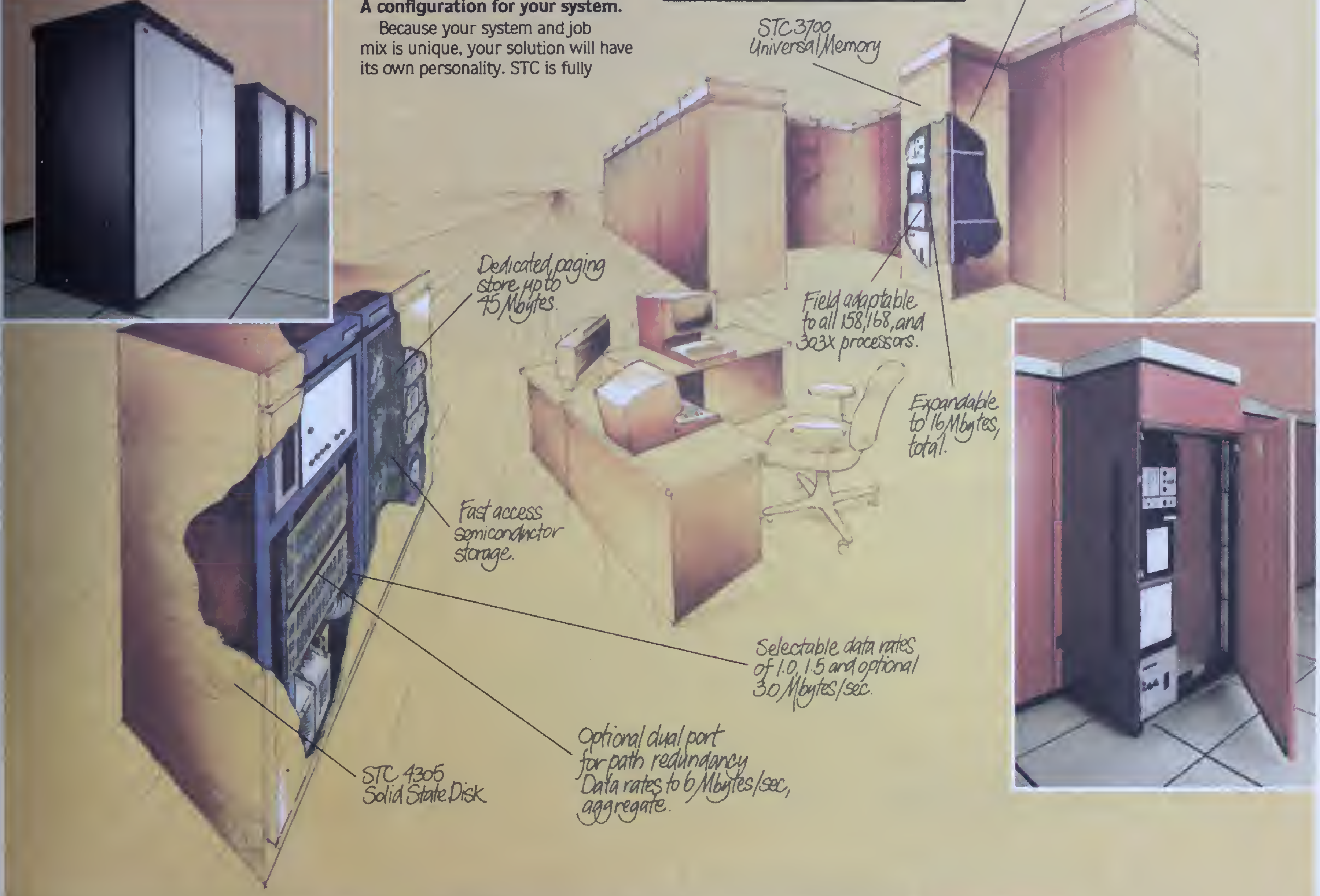
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Nova, Eclipse, Micronova Gain Disk Backup

HARVARD, Mass — The Cartridge Disk Backup System from Concentric Data Systems, Inc. was developed for the Data General Corp. Micronova, Nova and Eclipse processors using either 10M-byte or 20M-byte cartridge disk systems.

The recently announced system is a software package that assures the integrity of a computer system's cartridge-resident data base, Concentric said. It is said to enable users to identify each active cartridge disk with a unique name, dedicate one or more backup disks to each of the active master disks and define procedures by which active disks are copied to their dedicated backup disks.

The system costs $600 for the Micronova, $1,000 for the Nova and $1,200 for the Eclipse computer system. Concentric may be reached through P.O. Box 363, Harvard, Mass. 01451.

'Project Master' Updated for DG

COSTA MESA, Calif. — Applied Business Systems is offering Revision 2 of its Project Master interactive job cost and project tracking system for manufacturing firms, contractors and developers.

Written in Data General Corp.'s Multiuser Extended Basic, the package can be used as a stand-alone or it can interface with payroll, inventory control or accounts payable packages, the vendor said.

The package requires a DG Nova or Eclipse system with a minimum of 64K bytes of main memory and at least one disk, a CRT terminal and a printer. The system must be running single or Multiuser Extended Basic under unmapped or mapped RDOS, the vendor said.

The package costs $4,000 with a $400 annual support contract, the vendor said from B-6, 3303 Harbor Blvd., Costa Mesa, Calif. 92626.

Inquiry IV/IMS Elects Officers

LOS ANGELES — Larry Bristol of Occidental Systems, Inc. in Houston was recently elected president of the Inquiry IV/IMS Users Group. He succeeds Frank Bonio of Grumman Aerospace Corp., Bethpage, N.Y.

Also elected to posts within the users group were Steve Damiani of Grumman Aerospace, vice-president/-program coordinator; Kort Peters of Champlin Petroleum as secretary (second term); Barbara Vaughn, Nalco Chemical and Thomas Borgeois, TRW, Inc., co-chairpersons of the System Evaluation Committee, the group said.

The IV/IMS users group is comprised of DP and end-user personnel using the Informatics, Inc. data base under IBM's IMS. The users group can be contacted via Peggy Landon, users group coordinator, Informatics, Inc., 21050 Vanowen St., Canoga Park, Calif. 91304.

Seed Users Form Group

PHILADELPHIA — Users of International Data Base Systems, Inc.'s Seed data base management system have formed a users group called Grange.

More than 50 Seed users attended an organizational meeting of the users group held here in mid-November.

More information on the users group is available from International Data Base Systems, 2300 Walnut St., Philadelphia, Pa. 19103.

'Casemate' Takes Litigation Files

NEW YORK — Bowne Information Systems has unveiled an automated software system for use in small and medium-size litigation files of less than 10,000 pages.

Casemate was designed to bring automation benefits to smaller litigations in which either the number of documents is too small or the amount at stake did not warrant the expense of full-scale computerization.

In addition, it was also designed to serve as a preliminary step in the presettlement negotiation phase of litigation, a spokesman said.

The software costs between $2 and $3.50 per document, the vendor said from 160 Water St., New York, N.Y. 10038.

'Supervisor II' Modularized

NEW YORK — Stratmar Systems, Inc. has unveiled modular versions of its standard Supervisor II software for business applications.

The software is normally included in the firm's turnkey systems and modified to conform to customer specifications, but the modular versions will be marketed with operational documentation and without custom modification.

The programs are delivered in source code format and can be modified by the purchaser. Applications available include accounts receivable, accounts payable and general ledger.

The modules cost between $295 and $325, the vendor said from 385 Madison Ave., New York, N.Y. 10017.

UCC Establishes Link Tying Dallas, London

DALLAS — University Computing Co. (UCC) is establishing a data transmission link between its London and Dallas computer centers to provide access to civil and mechanical engineering applications — particularly finite element analysis, structural and stress analysis and nuclear codes.

Coverage of all types of stress problems in the design of aircraft, ships, offshore structures, space vehicles and structures, bridges, pressure vessels and radio telescopes will be included.

UCC's London center has a dual Sperry Univac 1108 computer configuration while the Dallas center has two Control Data Corp. Cyber systems. UCC is located at UCC Tower, Exchange Park, Dallas, Texas 75235.

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Bank Installs 'Extension Cords' To Relocate Remote Sites

By Brad Schultz
CW Staff

BOSTON — What's the best way for a user with host mainframes in one place to move remotely linked DP facilities from a second to a third place without interrupting crucial network services?

First National Bank of Boston here chose extension circuits as the means of routing data from a new site for the bank's remote DP gear to the gear's former location, where a microwave station remains. That station holds up one end of a microwave bridge to First National's mainframe complex in Boston's Dorchester district.

"The extension circuit solution could be useful to others forced to move their data processing or control centers," according to Kerry Overlan, First National's assistant vice-president for telecommunications.

Most of the space formerly occupied by the bank's remote job entry (RJE), batch input and teller terminal testing equipment at 100 Federal St. is now available for other purposes. The equipment was moved a block away to another downtown Boston address: 99 High St.

Both addresses are four miles from First National's Dorchester computer center, which has four IBM mainframes — two 3032s and two 370/158s — front-ended by IBM 3704 and 3705 processors. From High St., the bank remotely controls an IBM System/34 left at 100 Federal to support software development. The latter premises continues to feature a command console for monitoring Wats telephone traffic.

Big Problem

The big problem Overlan faced was how to move the remote peripherals to High St. without disturbing delivery of services through the microwave network to the bank's 35 Boston-area branch offices as well as to correspondent banks elsewhere in the northeastern U.S. First National accounts for nearly all the $15.8 billion in assets held by its owner, the nation's sixteenth largest bank holding company.

(Continued on Page 48)

SDLC, 3270 Users Gain Net Monitoring

BROOKFIELD, Wis. — A system for monitoring and reporting data network performance is available to those using IBM's Synchronous Data Link Control (SDLC), 3270 bisynchronous or equivalent facilities.

The Netstat/270 from Remote Data Systems, Inc. comes with its own software so monitoring and reporting can proceed without adding to the burdens of the user's host software, a spokesman maintained.

Remote Data's system measures performance for all specified terminals, control units and lines in the network, he added. And this data is summarized and transmitted to the mainframe by Netstat/270, which runs with the TP-270 Remote Network Analyzer turned out by Teleprocessing Products, Inc.

Netstat/270 is said to allow automatic control of sampling cycles. At system start-up the user selects the particular sequence of terminal, control unit and line addresses to be monitored, the spokesman explained.

The specified sampling cycle is then executed under control of Netstat/270 without further intervention.

User Specifications

Besides controlling the addresses to be monitored, the user may also specify the amount of time each address is to be monitored and the number of samples desired for each address.

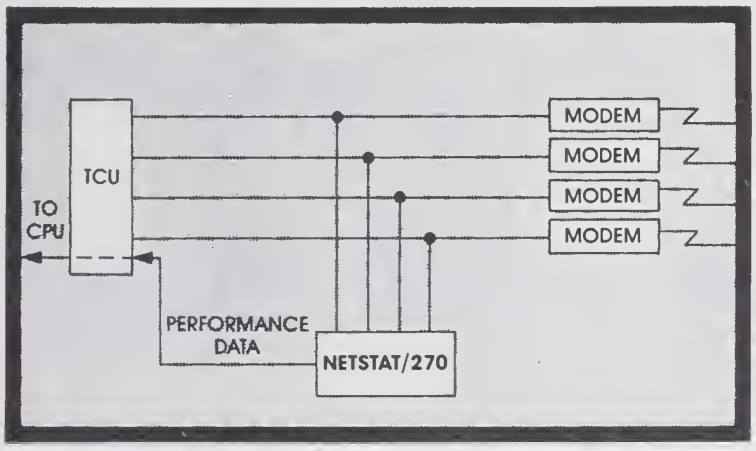
Some of the desired sampling cycles specified could require significant amounts of elapsed time to complete, the spokesman noted. For this reason, Netstat/270 is able to restart an interrupted sampling cycle at the point of interruption.

Data gathered by Netstat/270 sampling is stored in a direct access statistical data set. This data is available to the user if a need for implementing special-purpose analysis programs should arise. The system can knock out eight separate statistical reports on network performance.

When multiple terminals on a control unit are sampled, the spokesman continued, Netstat/270 will produce a "Control Unit Summary" report for each control unit referenced, reflecting a composite summary of all terminals subordinate to that unit.

The system may be customized to a particular network size and its modularity allows incremental expansion in proportion to network growth, the spokesman asserted. An entry-level Netstat/270, including control and reporting software as well as monitoring hardware for up to eight remote lines, costs about $10,000.

Remote Data Systems is located at 14640 W. Greenfield Ave., Brookfield, Wis. 53005.



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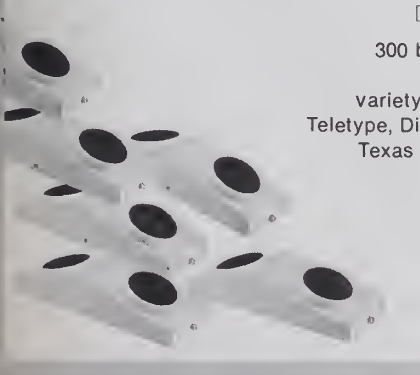

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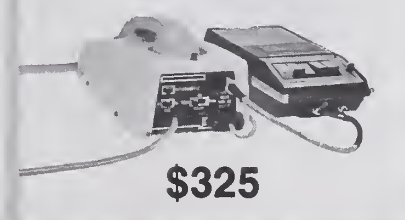

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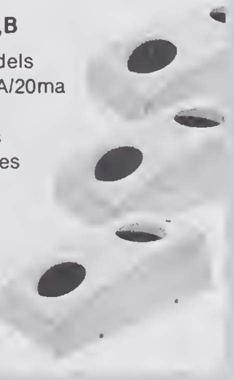

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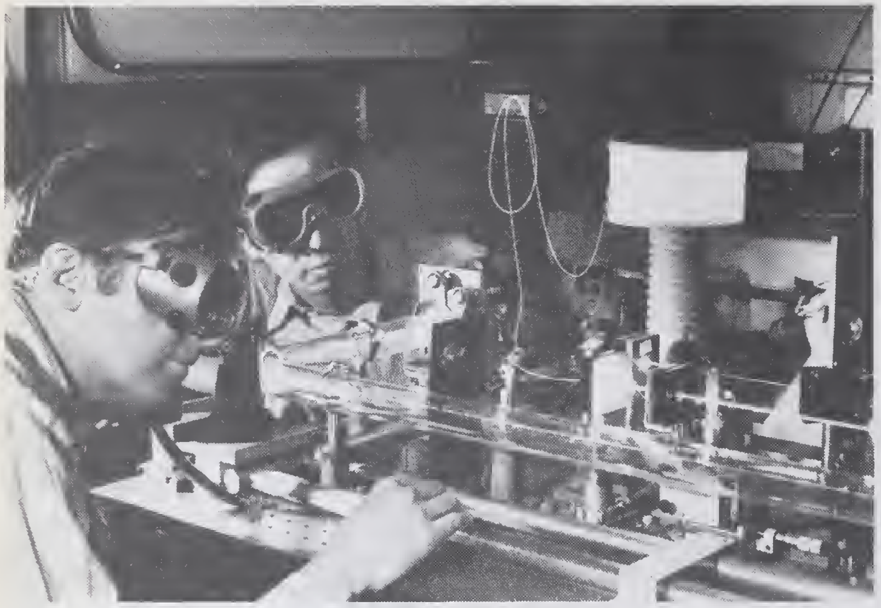

IBM reseachers Daniel L. Grischkowsky (left) and Hiroki Nakatsuka check out an optical bench where picosecond pulses of laser light are generated and transmitted. A 300-meter coil of fiber is the bright object at right center.

IBM Method Cuts Distortion In Optical-Fiber Signals

YORKTOWN, N.Y. — A means of eliminating the distortion of pulses in fiber-optic communications has been demonstrated by IBM scientists here. The technique compensates for the broadening of optical pulses caused by dispersion — differences in the speed of light of different frequencies in the glass fibers. It exploits work done some years ago at IBM on the compression of short laser pulses in alkali metal vapors at frequencies close to an atomic resonance frequency.

In this situation, the metal vapor is extremely dispersive, but its dispersion is of the opposite sign from that in glass. That is, in glass the longer wavelengths travel faster than the shorter ones, while in the metal vapor the opposite is true.

The effect in metal vapors is so strong that, in the IBM experiments, a 50-cm cell exactly compensated for dispersion of some 300 meters of optical fiber, IBM said. By providing for multiple passes through the cell, a cell of modest size could compress pulses traveling over kilometers of fiber.

Initial Experiments

In initial experiments reported in "Optics Letters," IBM researchers Hiroki Nakatsuka, a visiting scientist from Kyoto University, and Daniel Grischkowsky used 3.3 psec pulses from a dye laser of 5,878 angstrom wavelength. The laser linewidth (wavelength spread) was 2.1 angstroms. After passing through 325 meters of fiber, the pulsewidth had broadened to 13 psec. The pulses were recompressed to 3.3 psec after passage through the sodium vapor.

In an alternative mode of operation, pulses were initially broadened to 13 psec by the sodium cell and recompressed to 3.3 psec by passing through the fiber.

This technique could be used to transmit higher power laser pulses than the fiber normally would support, IBM explained. Broadening the pulse lowers its peak power at the transmitting end. As it travels along the fiber, it is gradually sharpened, but also attenuated by losses in the fiber so that its peak amplitude never exceeds what the fiber can support. The technique thus in principle could increase the distance a signal could travel through a fiber between amplifiers.

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Hazeltine Hikes Prices

GREENLAWN, N.Y. — Hazeltine Corp. has boosted prices by 4% to 15% on its 1400 and 1500 series data terminals, citing inflation as the reason.

"This marks our first price increase on these products since their introduction [in] March of 1977," a spokesman stated. Hazeltine reduced prices in March 1980 "due to volume efficiencies at a time when our competitors were raising their prices," he added.

"Unfortunately, the industry trend towards higher prices [as a result of] increased material costs has finally caught up to us," the vendor said.

Hazeltine's 1410 terminal now costs $895, the 1420 costs $1,035, the 1500 costs $1,225, the 1510 costs $1,355 and the 1520 costs $1,675.

'Extension Cords' Tie Remote Sites

(Continued from Page 45)

Overlan received a variety of solution proposals from vendors. One entailed extending the microwave link to 99 High St. by adding another broadcast station there whose transmissions would be picked up at 100 Federal and relayed from that microwave station to the Dorchester computer center.

Another vendor proposal was to run leased phone company lines directly from Dorchester to the new site. A third alternative was to broadcast directly from a new microwave station at 99 High to Dorchester. And there was a proposal to run local lines with either short- or long-haul modems from 100 Federal to 99 High.

Overlan eventually settled on a proposal by Data Brain, Inc., a Fairhaven, Mass., consulting firm. Data Brain's solution was for First National to acquire the appropriate lines from New England Telephone Co. and extend the microwave interface one more block to the new location.

This approach was more complicated than the relatively "clean" solution of direct or relayed microwave, but was estimated to cost just one-fifth as much as any viable microwave solution. According to a Data Brain spokesman, the extension cord approach was made technically and economically feasible by the availability of low-cost, yet sophisticated, short-haul modems.

Data Brain selected Prentice Corp.'s Synchronous Line Driver modems, which run at selectable speeds of 1,200- to 28,000 bit/sec. For First National, these modems are currently intended to run at no faster than 9,600 bit/sec with no more than four miles of cabling between devices attached at either end of the block-long pathway between 100 Federal and 99 High.

"The most important feature of the Prentice short-haul modems, for this application, is the series of built-in diagnostics which allows testing of functions by simply inserting a pin in the appropriate jack in the front panel," according to Data Brain's Al LaCroix, who worked with Overlan on the project.

Among the functions that can be tested in this manner are: local modem (the local analog communications loop); the local channel and telephone line (local digital loop); and the complete circuit, including the remote modem (remote digital loop). According to LaCroix, "the bank at that time did not have the technicians nor the accessory test instrumentation that testing and tuning would require with other modems. Nor did they need them for this equipment."

Synchronized Units

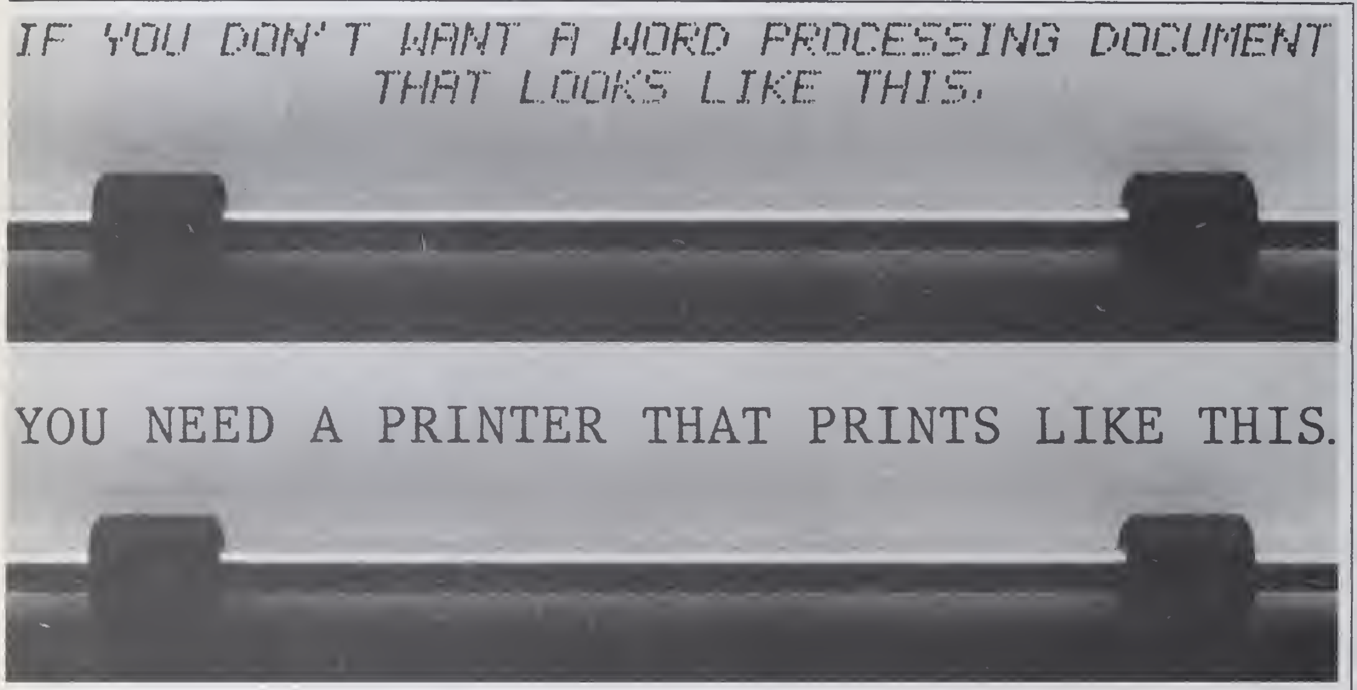
First National's Prentice modems are synchronized to a clock at the bank's Dorchester computer center, but can also operate on their own clock if necessary, LaCroix added. Through New England Telephone's 3005 phone lines, program development and RJE applications are passed between High and Federal Streets at 9,600 bit/sec; branch automation and international branch programming tasks proceed at 2,400 bit/sec.

First National also runs Prentice modems that emulate Bell 202T long-haul sets on the phone company's unconditioned 3005 and 3002 lines. Altogether, 20 active lines extend from 100 Federal to 99 High and another seven lines exist as spares.

After the lines were installed and checked out, First National moved the bulk of its remote processing facilities except for terminals and office furniture within two weeks, Overlan maintained. The final movement of machinery, desks and people was reportedly done on a weekend.

Correction

The touch-sensitive CRT terminals used by the Evanston, Ill., Public Library [CW, Dec. 29-Jan. 5] are part of an automated library system marketed by C L Systems, Inc. The terminals themselves were designed and manufactured for C L Systems by Interaction Systems, Inc. of Newtonville, Mass.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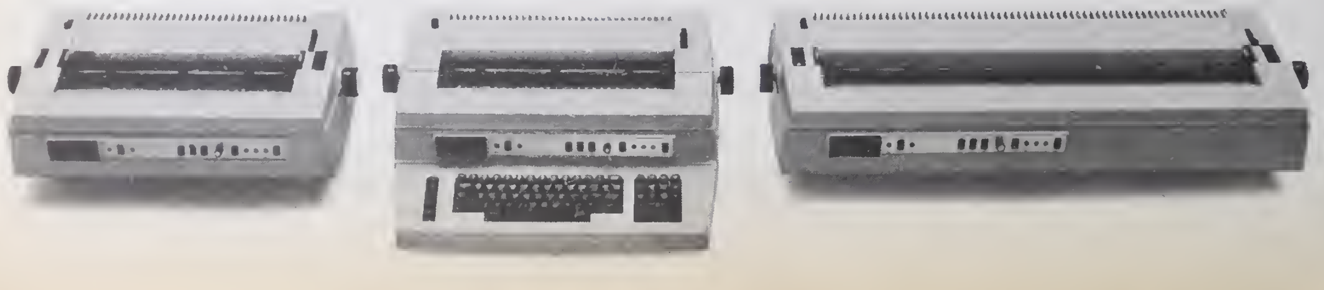

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"We switched to NCR," says Joseph A. Dee of Brooks Camera, Inc.

Joseph A. Dee (left) is president and chairman of Brooks Cameras, Inc. in San Francisco. Jim Sweeney is his NCR Account Manager.

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DEE:

Yes, but not directly. First, we selected a competing vendor's newly announced system. But as we started to plan, we began to see problems ahead. No tape drive. Perhaps no COBOL. Perhaps no match-up with our sales terminals. And all we could get from the supplier were vague assurances that the problems would somehow disappear. So we switched to NCR. Very fortunately, as it turned out, because our NCR system is up and running. While the other vendor is still not delivering the other system.

NCR's SWEENEY:

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DEE:

We had a shirtsleeve session with the NCR software people that was refreshing. They told us exactly where they stood. What we could expect and when. And that's the way it's turning out. They gave us the hard answers.

NCR's SWEENEY:

You liked Migration Path Engineering, too.

DEE:

Our requirements are too unique for us to expect off-the-shelf application software from any supplier. We have every kind of sales transaction. We accept all the regular charge cards as well as our own. We have rentals, repairs and layaways. And our own special promotions. So once we made the investment in our own specialized programs, we wanted to protect it. Even when our growth forces us to move to a larger system. With Migration Path Engineering, NCR can give us that protection.

NCR's SWEENEY:

And finally, you wanted one supplier who would assume responsibility for the entire system from A to Z — including the terminals.

DEE:

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Channel Systems Offers Two IBM Attachments

SANTA BARBARA, Calif. — Channel Systems International, Inc. is offering two IBM attachments.

For networking applications, the S1/X.25 hardware/software packages provide a means of connecting the IBM Series/1 to X.25-compatible packet-switched networks. The attachment costs $7,500.

The Series/1 may be used as a front-end processor to any host system with IBM-compatible byte, block or selector channels using the S1/370 channel attachment, the vendor claimed. That attachment is capable of emulating numerous standard IBM control units, a spokesman said. It costs $7,500.

Channel Systems International is located at 4129 State St., Santa Barbara, Calif. 93110.

Time Division Multiplexer Offers Eight Channels Plus Extensions

CANOGA PARK, Calif. — An eight-channel time division multiplexer that can accept extension units, each of which handles an additional eight channels, has been introduced by Canoga Data Systems, Inc.

The Model CMX-832 has a maximum channel data rate of 19.2K bit/-sec, asynchronous or synchronous. In synchronous mode, switches are provided to select the internal clock rate of 1,200-, 2,400-, 4,800-, 9,600- or 19.2K bit/sec. All synchronous channels are slaved to the clock rate.

The multiplexer transmits data in real time without storing in buffers. The multiplexer is totally transparent to the character structure of the data and there are no restrictions on character bit width or protocol.

Unlike statistical multiplexers, there is no waiting or other interaction between individual data channels, the firm claimed. Electrical channel interface is full-duplex EIA RS-232C.

The CMX-832 multiplexer has been designed to be a stand-alone unit with self-contained power supply. It costs $2,700 and each extender unit costs $2,000 from Canoga Data Systems, 6740 Eton Ave., Canoga Park, Calif. 91303.

Unit Replaces Bell 212A Set

SAN JOSE, Calif. — Tek-Com, Inc. is offering Model TC2121, a Bell 212A modem replacement.

The unit was designed for full-duplex transmissions of data at either 300 or 1,200 bit/sec over switched networks. Other features include compatibility with Bell 212A modems and 103/113 series modems, auto answer and manual originate/answer functions and microprocessor control, the vendor said.

The Model TC2121 costs $849, Tek-Com said from 2142 Paragon Drive, San Jose, Calif. 95131.

Service Features State Phone Tariffs

SARASOTA, Fla. — The Telcom MIS Division of Com Dev, Inc. has announced a service offering of all U.S. state tariffs of the operating telephone companies as well as the FCC tariffs.

Tarrifs (sic) was designed to inform telecommunications consultants, corporate communications managers, manufacturers and interconnect companies before they make buying decisions or plan strategy.

Full documents for all states except California cost $335 each, while California's costs $435. Update service is available at 22 cent/page. AT&T Tariff No. 259 — dealing with the recent restructuring of Wide Area Telecommunications Service (Wats) — costs $45 from the firm at 8049 W. Chester Pike, Upper Darby, Pa. 19082.

Kapusi Reworks Data Transceiver

SAN MATEO, Calif. — Kapusi Laboratories' high-performance short-haul modem, the DT19.2L Data Transceiver, has been redesigned so that up to 88 stand-alone units can now be fitted into a 6-ft rack using optional rack adapters, the firm claimed.

The DT19.2L works both synchronously and asynchronously up to 19.2K bit/sec. over twisted pairs with dc continuity, a Kapusi spokesman said.

The unit meets RS-232C, CCITT V.24, V.28 and Bell 43401 specifications. Maximum distance is 10 miles at 19.2K bit/sec and 40 miles at 2,400 bit/sec.

The modem costs $994 in one to nine quantities from Kapusi Laboratories, 2121 S. El Camino Real, San Mateo, Calif. 94403.

General Robotics Unveils Interface

HARTFORD, Wis. — The QLV11 quad serial I/O interface that features full DLV11-E compatibility on any of four RS-232 ports is being offered by General Robotics Corp.

The interface provides auto-answer modem support to Bell type 103, 113, 202C, 202D and 212 modems. All ports may be individually selected to be synchronous serial I/O ports. Bit/-sec rates may be selected for each port individually by switches in the range of 50- to 19,200 bit/sec and Uart parameters may also be switch-selected for each individual port.

A typical configuration for the QLV11 interactive unit might include an LSI-11 system with a console terminal on one port and an auto-answer modem, a serial buffered printer and a synchronous computer link to a large mainframe on the other three ports, the firm said.

The QLV11, which can be used in a multiuser environment, costs $800 in single-unit quantities from General Robotics, 57 N. Main St., Hartford, Wis. 53027.

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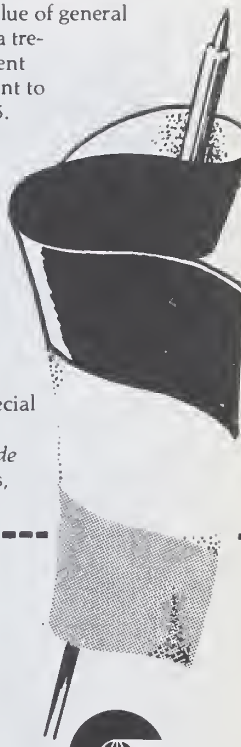

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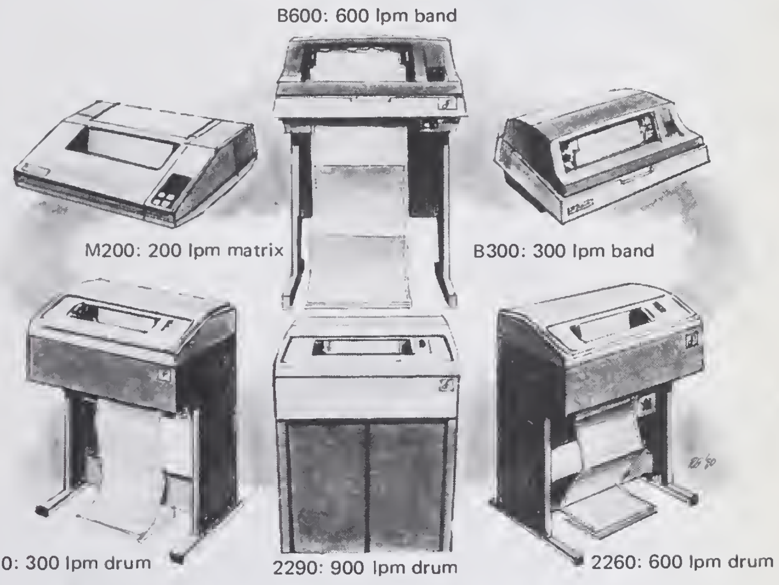

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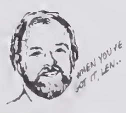
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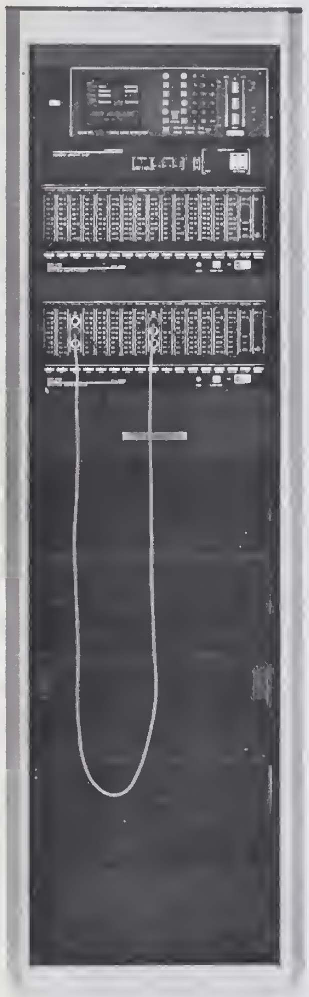

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Channel Monitoring System Boosts Testing Capabilities

ROCHELLE PARK, N.J. — Timeplex, Inc. is offering a channel monitoring system that gives the data communications user increased supervisory, diagnostics and testing capabilities.

The CM310 simultaneously monitors all data transmitted on up to three asynchronous data communications channels and displays the output on three CRT terminal screens.

The triscreen unit provides a variety of operating and display modes including both full-duplex and half-duplex real-time monitoring and display modes, Timeplex said.

Other features include displays of all 128 Ascii characters, including non-printing char.; monitoring of any data transmission speed from 50 bit/sec to 19,200 bit/sec and an internal 2,000-byte buffer, the vendor said.

The CM310 channel monitor costs $4,500 from Timeplex at One Communications Plaza, Rochelle Park, N.J. 07662.

DSU Option Extends DDS

NEWPORT, R.I. — Avanti Communications Corp. is now offering its 2200 Local Area Data Distributor with a Digital Service Unit (DSU) option, which reportedly extends DDS service up to four additional miles.

This synchronous line driver, available with an asynchronous option, operates over unloaded lines or coaxial cables at distances up to 10 miles and is compatible with Bell's Lads unit, the vendor claimed.

Standard switch-selectable speeds are 1,200-, 1,800-, 2,400-, 3,600-, 4,800-, 7,200-, 9,600- and 19.2K byte/sec.

When configured for the DSU application, the price of the 2200 is $1,220, the vendor said from Aquidneck Industrial Park, Newport, R.I. 02840.

Tektronix 4027 Gives Hard Copy

IRVINE, Calif. — Trilog, Inc. has introduced a hard-copy interface that reportedly will generate full-color plain paper hard copy for the Tektronix, Inc. 4027 color terminal on the Trilog Colorplot Model C-100.

The HC 4027 interface allows the color hard copy to be automatically generated by either operator- or computer-initiated commands, the vendor claimed. It accepts raster format RGB video data from the 4027 color terminal and converts this three-dot video pixel (R,G,B) to a four-dot copy pixel (Y,M,C, blank).

The price for the unit is $3,200. The vendor is at 17391 Murphy Ave., Irvine, Calif. 92714.

Syntest Offers Matrix Printer

MARLBORO, Mass. — Syntest Corp. has announced the SP-314, a dot matrix alphanumeric printer that features 12V ac operation; buffered 40-column impact printing; RS-232 serial and parallel inputs, crystal controlled baud rate; 96 char. Ascii set plus double width, and a self-test routine.

The unit uses 4.25-in. paper and costs $605.

The vendor is at 169 Millham St., Marlboro, Mass. 01752.

KIM Users Gain RS-232, Current Loop

BROOKFIELD, Conn. — The introduction of the ADA400, a two-circuit RS-232 to current-loop adapter, has been announced by Connecticut Microcomputer, Inc.

Designed for use with KIM microcomputers to allow the utilization of an RS-232 terminal instead of a current-loop teletypewriter, the ADA400 adapter both converts an RS-232 signal to a 20mA current-loop signal and converts a 20mA current-loop signal to RS-232. With this adapter, a computer's teletypewriter port can be used to drive an RS-232 terminal, or vice versa, without modification of the port, the vendor said.

In addition, the device can be paralleled to drive a Teletype or RS-232 printer while using the computer's regular terminals.

Complete with instructions, assembled and tested, the ADA400 retails for $24.50 with drilled, plated-through solder pads for all connections. Barrier strips and screw terminals are optionally available for a retail package price of $29.50 from Connecticut Microcomputer, 34 Del Mar Drive, Brookfield, Conn. 06804.

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December 19, 1980

Large HP Plotter Boasts Benefits In Cost, Size

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — Hewlett-Packard Co. last week entered the large plotter field with the introduction of a unit that reportedly boasts many of the same performance features as rival products but costs 50% less and occupies half as much floor space.

The HP Model 7580A owes much of its claimed price/performance edge to a ''low-mass, low-inertia'' drive system that dispenses with most of the heavy, bulky modules typically associated with flat-bed and drum plotters, a company spokesman said.

Instead of using large, expensive motors and other drive hardware, the 7580A incorporates a proprietary ''micro-grip'' drive that consists basically of a thin, light-weight cylinder coated with an adhesive that looks and feels a little like sandpaper.

The plotter's paper and other drawing media fit between the micro-grip drive cylinder and a rubber pressure wheel, which together advance the media up and down while the unit's pen carriage moves perpendicularly across the surface at up to 24 in./sec.

The absence of a hefty drive mechanism has enabled HP to cut the 7580A's weight to about 140 lb, compared with 300 to 900 lb for many competitive plotters in the same performance class, the spokesman said.

Simplicity of design has also resulted in fewer moving parts and thus improved reliability and uptime, the spokesman claimed.

Developed by HP's San Diego Division, the plotter boasts a repeatability of .002 in., a resolution of .001 in. and an acceleration of 4g. A company spokesman placed the 7580A in roughly the same performance class as competitive plotters like the Benson-Varian Model 5342 and the California Computer Products, Inc. Model 960.

Untapped Users

The 7580A's claimed ability to match the performance of $30,000 to $40,000 plotters for roughly half the price has reportedly opened the unit to classes of users who have historically found computer-controlled drafting systems beyond their financial means. Such previously untapped users include architects, industrial designers, mechanical draftsmen and civil engineers. The unit also suits more traditional plotting applications like mapping, computer-aided de-

(Continued on Page 54)

Arco Division Pulls Off Complex DP Facility Move

By Tim Scannell
CW Staff

PLANO, Texas — In what could be the largest move of its kind, Atlantic Richfield Co.'s (Arco) Oil and Gas Division recently packed up its entire Dallas DP operation and shifted it to a new location about 21 miles away.

The complicated move took place last year during the long Thanksgiving weekend and involved at least four IBM 3033 processors and assorted peripherals, two IBM 3851 mass storage units that hold about 512G bytes of data, 270 disk packs, 65,000 reels of magnetic tape and more than 800 communications lines, Karl Clauss, manager of the project, said.

Details of the move were mapped out over a period of 18 months, beginning in early 1979, and nearly 120 people concentrated on different phases of the massive project. Because of the size, complexity and proprietary nature of Arco's computer installation, the entire move was made without any definite contingency or backup and recovery plan, Clauss stated. In fact, the success of the move was totally dependent on how well each detail in the project was worked out on paper.

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On Feb. 26, *Computerworld* will run yet another chapter in its continuing series of Special Reports focusing on distributed data processing. Since most people in DP were weaned on such buzzwords as ''DDP'' and ''decentralization,'' we're sure that there are at least a million stories to be told about life in a distributed system — be they success sagas or tales from the computer crypt.

If you have a particular success story to tell, or aren't afraid to sling a little mud on a catch-phrase institution, send your five- to six-page, double-spaced typed submissions to Tim Scannell here at CW. The deadline for your true confessions is Jan. 19.

And who knows, even if you don't have the perfect solution ''punch line'' to the DDP riddle, at least you'd know that you grabbed a piece of the buzzword spotlight and tried.

'Flexible' Structure

Arco's new facility is a three-story ''flexible'' structure that was custom-built to accommodate both the operational and maintenance hardware of the company's DP shop. The building is also specially reinforced to support the multiton weight of a recently acquired Cray Research, Inc. Model 2300 computer. The structure's loading capacity is approximately 210 lb/sq ft as compared with the normal limits of from 100- to 130 lb/sq ft, Clauss explained.

To date, the new site consists of the Cray computer with 56.8M bytes of main memory, six IBM 3033 processors, two 3830 array processors, the mass storage units and 597G bytes of disk storage.

Since the Texas-based facility is concerned mostly with supporting the company's oil and gas exploration programs, the Cray

(Continued on Page 54)

Channel Tester For 370s Debuts

SAN DIEGO — A portable I/O channel tester for IBM 370 systems and plug-compatible mainframes has been announced by Data-Ware Development, Inc. The Model 9 I/O Channel Tester is said to act as a ''pro forma peripheral controller'' and interface with companion software in the mainframe-under-test.

The unit can be used for both system debug and channel burn-in testing, a spokesman said. Errors are analyzed with the help of a 16-word Fifo buffer memory.

Featuring its own power supply, the Model 9 costs $12,485 with a rack-mounted version, Model 8, priced at $11,935. Both are available in 135 days from 4204 Sorrento Valley Blvd., San Diego, Calif. 92121.

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Memory Card Fits VAX

SUNNYVALE, Calif. — A plug-in memory card for use with Digital Equipment Corp. VAX-11/780 computers has been unveiled by Intel Corp.

The MU-5780 add-in memory module is available in 512K-byte or 1M-byte versions, said to be equivalent to double and quadruple the capacity of DEC M8210 memories.

The module is organized as 64K or 128K words of 72 bits each and may be used to expand basic VAX-11/780 memories up to 4M bytes.

In three- to five-unit quantities, the 512K-byte version costs $4,350; the 1M-byte version costs $8,400 from Intel at 1302 N. Mathilda Ave., Sunnyvale, Calif. 94086.

Arco Moves Dallas DP Operation

(Continued from Page 53)

computer was brought in to handle the heavy scientific number crunching required by geological research, Clauss said. In fact, the Cray actually acts as a slave to the IBM 3033s during its operation.

Race Against Time

While shifting its locational gears, Arco not only had to keep track of the system's disassembly and assembly, but had to race against the clock to restore access to the computers for its more than 1,500 time-sharing users. That is why the company took advantage of the long holiday weekend last November to buy extra time in case a difficulty erupted, Clauss observed.

As a computerized aid, the division employed the facilities of a management control and scheduling system that automatically tracked more than 4,000 detailed tasks that were individually executed during the move.

"Because our systems were totally intertwined, we made this a single-move type of strategy," Clauss said.

Other features of the Oil and Gas Division's new computer home include extensive access control and monitoring systems, security checkpoints and an uninterruptible power supply with enough power to light 4,000 homes, Clauss stated. The facility also has a 24-in. raised floor that was designed to cover the center's sea of cables and wires which snake below the machines.

Arco's project manager explained that the Texas facility is presently the largest single user of IBM computer cables.

Besides the Plano facility, Arco has two other DP centers: one located in Los Angeles that basically handles batch work, and the other in Philadelphia.

Spurred by the success of its recent move, the company is planning to relocate its Los Angeles center sometime this May to another part of the city. The reason for the spring move, according to Clauss, is to install the computers in a sturdier building, designed to withstand the earthquake tremors common to that part of southern California.

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HP Adds Plotter With Cost Edge

(Continued from Page 53)

sign and computer-aided manufacturing, the spokesman said.

HP credited the 7580A with accepting drawing media like paper, vellum or polyester film ranging from 8 in. by 10.5 in. to 24.5 in. by 46.85 in.

Capable of attaching to any HP or non-HP processor equipped with an RS-232C or IEEE-488 interface, the plotter incorporates 48K bytes of random-access memory and a Zilog, Inc. Z80 microprocessor that reportedly allows the unit to automatically set plotting parameters and maintain constant drawing speed, even when producing diagonal lines.

Pen Capper

Through an HP terminal like the Model 9845, the plotter can also be programmed to automatically scale down drawings and automatically cap pens to prevent their tips from drying out, the spokesman said.

Operating under control of HP's Industry-Standard Plotting Package, the 7580A can be further programmed to produce drawings with as many as eight colors and line widths, a spokesman noted.

The plotter achieves its pictorial variety by automatically selecting the appropriate pens as needed from a rotating carousel that holds up to eight pens.

The 7580A, excluding application software, costs $15,450 and is available in from eight to 15 weeks from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Bar Code Wand Fits Manufacturing And Program Entry

PALO ALTO, Calif. — A bar code wand designed for use in manufacturing environments and for program entry for personal computers, appliances and intelligent instruments has been developed by Hewlett-Packard Co.

The Heds-3050 features internal metal shielding to reduce susceptibility to electromagnetic interference, electrostatic discharge and ground loops in ac-powered systems, a spokesman said.

The Heds-3050 costs $110. HP is at 1507 Page Mill Road, Palo Alto, Calif. 94304.

A Floppy Primer — Part 1

Brown Shoe, Black Boot Bad for System

By Robert Steinberg
Special to CW

Will the flexible media you're using today meet your system's need tomorrow? This week, in the first half of a two-part series, Robert Steinberg of Zilog, Inc. gives a consumer's eye view of the differences between each manufacturer's disk certification procedures and specifications, exploring why Brand A floppy might not always be the same as Brand B.

Next week, Steinberg tells why cheaper is not always better and offers a few inflexible rules of caring for flexible diskettes.

Just as a brown shoe should never be worn with a black boot, improperly matched media should never be used in a well-designed computer system.

Therefore, it is important to select the media that will best suit the application of a particular computer system. Preferably ones that will retain and read back all the important data, with the fewest errors and for the longest time.

However, making an intelligent choice of media requires an understanding of the criteria by which manufacturers certify their products. Although many manufacturers claim their products are rated at 100%, the rating may be based on a testing procedure that does not include difficult or important specifications.

Criteria used for media certification can be divided into two groups: those which are "lot-oriented" and those that vary from disk to disk.

Let us first look at the lot-dependent criteria. With this particular method, manufacturers describe a lot as a group of disks processed by the same procedures at the same time.

Because of thermal and hygroscopic or humidity expansion factors, it is important to remember that random sampling methods are generally inadequate. A user considering disks manufactured in such a manner should check to see if the tracks and gaps on both sides of the disk are tested. This includes whether the disk is single- or double-sided.

The buyer should also check to see if the disk was tested for "dropout," which is the loss of data due to deficiencies in coating thickness and defects in the coating surface from holes, pits, bubbles and foreign particles.

Head-to-disk compliance should also be checked and the user should be wary of missing or extra pulse, which occurs when coating deficiencies cause false data blips.

A third factor to consider when buying lot-produced flexible disks is modulation. Improper modulation characteristics — caused by variations in coating thickness and density — may result in bit shift.

The final consideration in this group is amplitude. Amplitude affects the read-back ability of a disk and should be checked most carefully at the innermost tracks, where bit density is greatest.

Disk-to-Disk

Like the criteria used to rate lot-oriented disks, there are a number of factors that should be considered when looking at disks certified on a disk-to-disk basis.

For instance, users should be aware of the disk write-over ability, or ability to record data over a prerecorded track. The disk should allow the user to completely erase prewritten information while writing new data and return an error-free reading of that new data. Vendors usually test for this ability by writing a single-density track over a double-density track.

The user should also watch for

(Continued on Page 56)

Single-Card Controller

Tally Printers, DEC Systems Tied

KENT, Wash. — Mannesmann Tally has unveiled plug-compatible controllers to interfact its printers with Digital Equipment Corp. VAX-11, PDP-11 and LSI-11/24 processors.

Featuring single-card construction, the controller fits into the DEC Unibus without hardware or software modification, the vendor claimed, adding that a 15-ft cable and connector for the printer is provided.

The printer controller can be used with both serial printers and line printers, available from 160 char./sec to 300 line/min, a spokesman said.

The controller is compatible with all DEC operating systems, including RT-11, RSX-11, RSTS, IAS, TSX and VMS, he claimed.

The controller is sold only as part of a controller-printer package. Sold with a 300 line/min printer, the PDP-11 and VAX packages cost $6,600. The LSI-11 controller-printer package goes for $6,200, the vendor said from 8301 S. 180th, Kent, Wash. 98031.

Microstar Business System Debuts

IRVINE, Calif. — Microfive Corp. has unveiled its newest Microstar business computer system combining 8-in. Winchester, 8-in. floppy disk and .25-in. cartridge tape drives.

A self-contained system, the Microstar Series 3000 provides 10M to 34M bytes of hard disk storage, 1.2M bytes on a double-sided floppy disk and 13M bytes for cartridge tape backup.

In addition, the 16-bit computer includes up to 512K bytes of main memory and direct memory access channels for input/-output. As many as 10 user stations can be supported, with five I/O ports standard. Optional battery backup for main memory is also available.

The system supports Microfive's Stardos multiuser, multitasking operating system and Update, a data base management and report generating system. Through an optional conversion program, it can execute programs written in Business Basic II and Business Basic III.

Microfive's library of software packages is said to cover a number of commercial applications. The Microstar Series 3000 will be shipped in the second quarter of 1981 and prices will start at $18,000. The vendor can be reached at 17791 Sky Park Circle, Irvine, Calif. 92714.

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Brown Shoe, Black Boot Said Bad for System

(Continued from Page 55)

a disk's ability to record and play back high-frequency signals. This ability, called resolution, relates directly to the disk's coating thickness and amplitude.

Perfect resolution would produce a one-to-one ratio of single to double densities.

Other Factors

Other factors to consider before choosing a particular flexible disk include: head-to-disk interaction, which relates to head-to-coating spacing; head resonance and head geometry; bit shift, a disk drive-to-disk phenomenon that concerns the disk's ability to record data in the precise magnetic position desired; and amplitude, which, as described before, is the playback signal strength.

Perhaps the most recognizable feature, or drawback, of a flexible disk is its physical life span.

Primary factors that should be considered here are head wear, disk wear, head loading and clamping.

Head wear is the amount of degradation the disk produces on the drive's head mechanism.

Unfortunately, in an attempt to produce a better grade disk, a lot of manufacturers have begun to use hardening agents in their coating mixture. These agents may cause increased abrasion, which raises head temperature and results in premature head failure.

Disk wear relates to the number of revolutions a disk will turn and still be able to maintain data integrity. Vendors test for this by focusing on random tracks and using an approximate target figure of two million revolutions — or about 20 eight-hour days of continuous use.

Head loading is the mechanical action of placing the disk in contact with the head. Any loading causes transient stress on the disk's oxide coating and results in uneven wear. A typical goal is about 50,000 loadings on the same point of the disk track, after which the ability to read and write on that track without error is maintained.

Finally, clamping type of wear is generally drive-dependent.

Unfortunately, no disk manufacturer can compensate for a poorly designed clamping mechanism, which may cause excessive pressure on the disk and ultimately wear right through the disk.

Mini Bits

LSI-11s, AIM-65s Get Power Supply Units

CANTON, Mass. — Power General is offering the Series 2050, a dual-output switching power supply for Digital Equipment Corp. LSI-11 and Rockwell AIM-65 microcomputers.

The unit is available in an open-frame model for $123 and in an enclosed-frame model for $133, the firm said from 152 Will Drive, Canton, Mass. 02021.

Interface Card Enters DC Voltage Readings

PALO ALTO, Calif. — An interface card that can measure analog dc voltages and directly enter digital readings of the values measured to a desktop computer is now available from Hewlett-Packard Co.

The HP 98037A four-channel, analog-to-digital converter enables any HP 9825, Series 9800 System 35, or System 45 computer to measure dc voltages without using a conventional digital voltmeter/interface-bus system.

The HP 98037A costs $750. HP is at 1507 Page Mill Road, Palo Alto, Calif. 94304.

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Extender Fits Series/1

ORANGE, Calif. — MDB Systems, Inc. unveiled an 18-in. extender board which allows users to debug their own circuitry as well as any IBM module, the vendor claimed. The firm also introduced a microcomputer system for data logging.

The extender board is an enhancement to MDB's line of products for the IBM Series/1 and costs $395.

The logging system, the MLSI-11/03-580, incorporates a Digital Equipment Corp. LSI-11/2 microcomputer and two TU-58 cartridge tape units with data capacity totaling 500K bytes.

The complete system costs $4,995, the vendor said from MDB Systems, Inc. 1995 N. Batavia St., Orange, Calif. 92665.

Regi-Star Gives Preregistration For Conference Attendees

NEW YORK — A system for the preregistration and on-site registration of conference and seminar attendees is being offered by Interactive Computer Systems, Inc.

The system, dubbed Regi-Star, produces invoices and receipts and prints tickets and labels. Wait lists are kept for reserved items that are sold out. Hotel registration lists are maintained, and attendance sheets by event can be produced. Post-conference analysis produces attendance information by event, state, affiliation or other topics.

An on-line, interactive system, Regi-Star immediately provides information on available space, number of tickets sold and revenue collected.

Regi-Star incorporates a 165 char./sec high-speed printer, full alphanumeric keyboard, CRT terminal screen, memory and central processor.

In addition to performing registration, the system can also perform all standard accounting applications, the firm said.

Prices vary depending upon the number of simultaneous users, software modules chosen and degree of customization. A single standard user system starts at less than $20,000. A multiuser system with five workstations, the accounting packages, word processing and expanded memory costs approximately $40,000.

Interactive Computer Systems is at 312 E. 23rd St., New York, N.Y. 10010.

Array Processor For PDP-11 Has Fortran Library

NEWTON, Mass. — Computer Design & Applications, Inc. is offering the MSP-3X, an array processor that features a library of Fortran-callable routines for vibration, sonar and communications analysis.

Designed for Digital Equipment Corp. PDP-11 minicomputers, the MSP-3X is contained on two standard hex-size circuit boards, which plug into slots on the host computer, the vendor said.

The MSP-3X costs $4,950, the vendor said from 377 Elliot St., Newton, Mass. 02164.

Atari 400, 800 Get RAM Board

OREGON CITY, Ore. — A user-installable 32K random-access memory (RAM) board has been developed by Mosaic Electronics for use with Atari, Inc. 400 and 800 microcomputers.

With the board, Atari owners can use disk drives and large data arrays while operating in high-resolution graphic modes, the vendor said.

The Mosaic 32K RAM board will be available in February. It will cost between $325 and $350. Mosaic Electronics can be reached through Box 748, Oregon City, Ore. 97045.

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Mass storage on a portable terminal? Absolutely. The 2675's high-speed, high-density cartridge tapes even reduce waiting time and optimize storage space. And the advanced editing features let you update recorded information as well as make corrections before sending data to the computer.

The 2675 is also remarkably easy to operate. It uses friendly, English-like commands, and has a familiar, typewriter-style keyboard with eight soft keys you can define yourself. Once you've tailored the terminal to your application, those configurations come up automatically at every power-on, including automatic dialing and program calling. So even an inexperienced user can just pick up the terminal and go.

For fast, high-quality printing, the 2675's quiet thermal printer operates at up to 120 characters per second. And multiple print modes allow the printing of full-width computer reports on 8½″ paper.

It makes communications a snap.

With both an RS-232-C and modem port, you can configure the terminal for two transmission speeds, each ranging from 300 to 9600 baud. And, to increase transmission accuracy, the built-in modem comes with a convenient modular jack for direct connection to your phone line.

What's more, the 2675's auto-answer and auto-dial features leave you free while the terminal's talking to the computer, and let you save by taking advantage of off-peak phone rates.

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Corvus Mirror Gives Backup for LSI-11

SAN JOSE, Calif. — Corvus Systems, Inc. has unveiled the Corvus Mirror to provide backup data to Corvus disk drives used with Digital Equipment Corp.'s LSI-11 computers at a 1M byte/min rate using standard videocassette recorders with 120M-byte capacity cassettes.

The contents of an entire 10 million-byte disk can be transferred onto the Mirror standard videocassette medium in approximately 10 minutes, according to Corvus. The Mirror can also provide archival storage for large data bases.

In operation, the Mirror interfaces the data signals on the disk to a separate videocassette recorder. For long-term compatibility with all Corvus products, the Mirror uses the same Z80 microprocessor and Corvus interface bus used with the Corvus disk.

The Mirror controller firmware resident in the Z80 controller provides an intelligent interface to the host computer which specifies either Read, Write or Verify operations.

The removeable backup Mirror costs about $1,500 from a Corvus dealer or from the vendor at 2029 O'Toole Ave., San Jose, Calif. 95131.

Cambridge Digital Adds Kit To Tie RK05-J Drive, LSI-11

CAMBRIDGE, Mass. — Cambridge Digital is offering a kit for interfacing RK05-J disk cartridge drives to the Digital Equipment Corp. LSI-11 family of microprocessors and has published a catalog featuring LSI-11 microcomputers and compatibles.

The controller kit allows users to operate RK05-J subsystems previously installed on PDP-11/23 computers, the vendor claimed. It will interface up to eight drives daisy-chained together for a total capacity of 20M bytes of on-line storage.

The price for the kit is $1,800.

The catalog may be obtained free of charge from Cambridge Digital, a division of Compumart Corp., through P.O. Box 568, Department 73, Cambridge, Mass. 02139.

System Offers DP, WP

ROSEVILLE, Minn. — Maatra Corp. has introduced a self-contained computer system that offers DP and word processing (WP) capabilities for business or scientific applications.

The MT500 features a CRT display, a Z80 microprocessor, the CP/M operating system, 64K bytes of random-access memory and two 500K-byte, 5.25-in. floppy disk drives, the vendor said.

A 45 char./sec printer is available as an option, the vendor added.

The package costs around $6,000 from Maatra at 1835 W. Shryer Ave., Roseville, Minn. 55113.

Courses Aimed At Apple Users

ST. LOUIS — Educational Programming Systems is offering short courses on business management and financial planning for users of Apple Computer, Inc. personal computers.

Called Compucourse, the package consists of several educational application programs, on diskette, which offer basic instruction, problem-solving techniques and planning tips.

The package runs on the Apple II with extended Basic or the Apple II Plus microcomputers. The minimum memory requirement for both systems is 32K bytes.

The first Compucourse package consists of three programs: personal financial planning, improving memory skills and planning cash flow. Each program costs $99, the vendor said from 3328 Baur Blvd., St. Louis, Mo. 63132.

Floppy Disk Debuts For Zenith Z-89

GLENVIEW, Ill. — An 8-in., dual-sided, dual-density floppy disk system designed for use with the Z-89 microcomputer system is available from Zenith Data Systems (ZDA).

The Z-47 can provide up to 2.5 million bytes of data and program storage when used with the ZDS microcomputer built-in 5.25-in. disk drive. Each disk provides space for one million bytes of data.

The product costs $3,695, the vendor said from 1000 Milwaukee Ave., Glenview, Ill. 60025.

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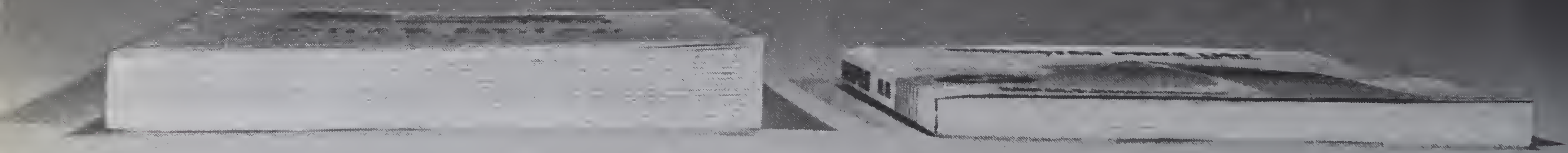

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What's Ahead in DP?

AN INTERVIEW WITH THE EDITORS OF AUERBACH PUBLISHERS INC.

Everyone has an opinion about the direction data processing will take in 1981. A "round-table" discussion group made up of Auerbach personnel was recently convened to examine the changes that will effect the data processing industry over the next year.

The round-table group consisted of William Sommerfield, Elizabeth Krefft, Rona Cohen, Jan Wright, Charles Campbell, William Engle and Robert Hauserman. Sommerfield is a vice-president of Auerbach and serves as editorial director. Krefft is the managing editor for the *Auerbach Computer Technology Reports* series. Cohen serves as product manager of the Auerbach *Computer Technology Reports. Plug-Compatible Peripherals Reports, Financial/Retail Systems Reports* and *Office Systems Reports* are under Wright's direction. Campbell is the editor of *Data Communications Equipment Reports* and *Computer Terminal Reports.* Engle serves as editor of the *Applications Software Reports* and the *Systems Software Reports.* Hauserman is an editor of the *Minicomputer Reports.*

Five of the seven technical editors and experts at Auerbach Publishers Inc. assembled for a round-table discussion of the year ahead in DP are shown above. From left: William Sommerfield, William Engle, Robert Hauserman, Charles Campbell and Elizabeth Krefft.

What forces will drive the data processing industry during 1981? Will very-large-scale integration (VLSI) become a reality and drive the industry, or will it be some other development?

Krefft: Everybody is facing hard times and is looking for ways to save money. That, as much as anything, will be the driving force.

Wright: I don't think that VLSI technology will drive the industry. The problem people have in their offices is declining productivity. Identifying the causes of that will drive the industry.

Vendors will certainly use new technologies in developing their products, but the technologies themselves won't cause the products to be developed.

Engle: If VLSI becomes cost-effective, it will be used as a competitive marketing feature rather than to satisfy a demand. It will be in demand only because people will perceive it as more cost-effective. Commercial processes essentially operate at human-operator speed. We are not talking about a large number-crunching operation which would be aided by a hardware advance. I do not, therefore, perceive those types of developments driving the industry.

Campbell: I don't see any particular hardware or technology development coming along in 1981 that is going to make any significant change. The major change will be cost. Software, programming and communications costs are going to increase in 1981. For example, AT&T will do its best to virtually eliminate its bulk rate facilities. Other carriers that have been holding down prices for four or five years are now starting to say, "Inflation has been eating me up for three years. I have to jack my rates up to catch up."

There will be increases in communications costs. As a result of these increases, people will start looking at their options. These options have been available for years, but users have been reluctant to consider them. In the past, it has been status quo for the most part, but rising costs will force people to become adventurous. That's the change we will witness in '81.

What specific changes do you foresee in 1981?

Engle: An area that will impact data processing from the software point of view is the integration of the data management functions. Today, you have several pieces of software. These pieces are being integrated and being restructured with an interface that reflects the user's logical view. The user only has to ask for what he wants; he doesn't have to worry about the different structures.

Another area of importance is the immense growth of applications packages. There will be a distinct shift away from the present reliance on highly technical people. More and more the tools will be available to reduce the end user's reliance on the applications programmer. Traditionally, end users have had a difficult time communicating their needs to the data processing people and getting back a program that looks like the original request.

An example of the end user's developing independence can be taken from a conversation I had about a year ago. This user was the head of personnel for a large company, and he had requested an estimate from his data processing department for an on-line human resource system. The estimate he received was not only intolerable in terms of the time it would take, but the cost was very high.

This user bought a package on his own and installed it with his own people. In six to eight months, he had this package operating, and he is very satisfied with it. This is an outstanding example of what users can and will be doing.

Wright: As far as I can see, the understanding that office managers and the heads of corporations will gain about information and the value of information as a commodity is the most important element that is going to affect the office industry. I don't see any major hardware changes. Software development will, of course, continue, but only because the users will be saying, "This is the information I need. This is how I use it. I want you, the vendor, to tell me the best way to do this."

Except for a gradual evolution that has already started in 1979 and 1980, I don't foresee big changes in the office industry or the office automation area.

Campbell: 1981, as I said before, will be the year of substantial increases in the cost of communications. People are going to stop doing business as they have in the past, or they will at least consider alternative ways of doing business. I don't see people automatically turning to AT&T as their sole source anymore. They are going to look at the different alternatives that are available.

I also feel that more integrated analog and digital installations will be seen. They have been talked about, but '81 is the year they are going to become a reality. The best way to economize is to pack all your communications facilities to their maximum, and the way to achieve this economy is by integrating voice, data, facsimile and word processing communications. A few integrated voice and data systems are already appearing on the market, but there will be increased activity in that area during the next 12 months.

Hauserman: There will also be an increase in business packages and busi-

(Continued on In Depth/2)

William Sommerfield is editorial director.

Rona Cohen is product manager of *Computer Technology Reports.*

(Continued from In Depth/1)

ness systems during the next few years. The trend, however, is away from big data processing staffs and towards the use of computers by nontechnical users.

You will also see a dramatic increase in turnkey systems.

In the minicomputer area, I feel the vendors will concentrate, for the most part, on developing the 16-bit architecture.

In addition , the development of the X.25 protocol is going to continue slowly. Although more and more minicomputer vendors are announcing commitments to X.25, I'm not convinced that they want the compatibility between machines that X.25 will offer.

Campbell: I disagree. I think we will see X.25 more and more. The business community will not stand for systems that are not compatible across the board. More and more, the manufacturers are realizing this. X.25 is a common ground that everyone will be able to agree on.

I don't think anyone will be able to sell a system in the future that isn't, at least in some way, compatible with most other machines on the market. People are getting annoyed. They invest money in a machine, and later when they want to expand they find that the only thing they can use is another of the same machine from the same manufacturer. They don't like that. They're not taking what the vendor gives them anymore; they're starting to demand certain things.

How do you see the user's demands being accommodated?

Campbell: Businesses, especially small firms, are refusing to consider buying multiple systems with independent hardware. Either they can't afford it, or they see it as a waste of money. Maybe it's idealistic, but they want integrated systems that will solve all their needs. Further, they don't want to be forced into dealing with only one vendor. Unfortunately, the problem right now is that most vendors don't support that type of integrated system. Nor do vendors seem to be overly concerned about intersystem compatibility. I guess that serves to retain the customer base and sells more hardware.

Wright: Almost all the word processing vendors now offer some kind of integrated system. Its data processing capabilities may be limited to record processing, sorting or selecting, but it is, at least, a basic form of data processing. It allows the user to massage those kinds of files that provide data processing information as well as do his word processing. I think that's true on the other side of the house also. Quite a few minicomputer vendors are also offering word processing packages.

A problem, however, is that there are too many choices for people to make and too little information is available on choosing the best equipment for their application. Take a typical integrated word/data processing application. There are, at least, two perfectly clear routes available. The user can go with a minicomputer equipped with a data base and retrieval system, or he can select a stand-alone word processor with some data processing capabilities.

The user is not even sure which vendor he should call. So where does the user go with that kind of question?

Cohen: A few of my peers who have been in the industry have gone into their own businesses. They have married a piece of hardware with some software. They put it together and supply to a well-defined marketplace. This seems to have been a successful approach over the last few years.

Wright: They are selling solutions. Here's a user with a problem. I walk in the door and offer a solution to his problem. That makes it really simple for the user. He doesn't have to worry about the technologies or anything else. I'm one person with one company who is going to sell and support the system. Further, I am paying attention to his problem, and I've worked out a solution.

Sommerfield: A few items that have been mentioned should be reemphasized and placed in context. It is not sufficient to say that systems are becoming more end-user-oriented, because there is a wider scope. First, I'm not even sure who the end users are anymore. They include nontechnical professionals with a very wide range of sophistication. Some of them know a great deal about computers. Certainly, they don't program and they don't go out and buy telecommunications equipment. But they know a lot about computers.

The end users are now involved in software and hardware planning as well as acquiring the system. The data processing person, who previously was a very important member of the project team, is just another member of that team now. When the other members of the team cannot answer technical questions, he's asked to supply that information. He is no longer in the leadership role that he assumed so often in the past.

As a result, the planning is being taken over by nontechnical professionals. The entire environment of people using computers to solve problems is based on the fact that these people are beginning to understand how to better utilize the output of systems.

I am specifically addressing manufacturing areas where they're planning a closed-loop system using software modules. These software modules are designed to produce information for such functions as planning, materials requirements, shop floor control and inventory control.

If you look at the whole process together, there are some very interesting things happening. The computers have always been in place, but the understanding of the system and how it effects all the people in the manufacturing environment is escalating. The planning staff and salespeople, who are predicting how much they will sell, the people who are ordering inventory to supply the projected demand and the people who are scheduling machine time to ensure an adequate supply of products are coming closer and closer together.

It is my opinion that large productivity gains will be made through a better understanding of the computer's role and the output of these systems.

In other words, people will start to understand that information really is the lifeblood of the organization. The computer is playing a vital role, but it is not *the* important role. It is only one of the tools in a system that will help people perform their jobs. Those people have become very sophisticated and perceive the computer and software not as the tip of the pyramid, but as the base.

The actual output and how that output is utilized are the elements that are very important.

People are just getting smarter about the whole process.

It seems as though all the vendors are talking about productivity. Do you see any advances in this area during 1981?

Wright: In fact, some of the measurements of office productivity show that it has actually dropped during 1980. This decline is partially caused by the changing role of personnel caused by the infusion of different equipment. These changes have created a general confusion over what's happening. No one seems to be sure how it should all be put together.

I think these facts will lead to a certain period of time in 1981 where productivity may actually decline instead of increase.

It will, however, swing towards the increase based on the new equipment and software, but it will be a slow, gradual process.

Remember, there has been a change in the marketplace over the last couple of years towards more sophisticated users. People are understanding their own office needs better and are indicating those needs more successfully to the vendors. As a result, it is no longer strictly a vendor-driven industry.

Part of the problem behind the decline in productivity in 1980 was that much of the equipment installed in office environments was vendor created and designed. It was the vendor's idea of what offices needed, which wasn't necessarily the correct assumption. Now, as people learn more about the equipment, they're saying, "Hey, this doesn't quite do it. It's creating more problems than we had in the beginning."

The users are going back to the vendors and saying, "This isn't what we need. We need some fine-tuning here and these additional capabilities. Once you do this, you will have the equipment we need and the equipment we can use in the office."

It's a two-way process. The vendors and the users are starting to work together, and they will be creating products the users need.

Sommerfield: To add to that, I've noticed that there is a growing interest in increasing productivity through one known automated office system. That was a buzzword for quite a while, but everybody thought they were in the automated office business when they got their first word processor. They weren't. They had a sophisticated electronic typewriter and never got to the second step.

An interesting parallel can be found in our own electronic office publications. When they were first announced a year ago, the user environment wanted more information on integrated systems. In other words, a majority of the people are beginning to grow from their original stand-alone word processors to shared logic and integrated systems. The whole group of users have become more sophisticated in their understanding of the technology.

Undoubtedly, the technology has been sophisticated enough for a sufficient period of time to be a significant factor in increasing productivity. But it hasn't. However, as the systems are being fine-tuned to the users and users become much more educated and sophisticated themselves, they will be able to put these elements into a proper perspective.

I suggest that we may not see any real gains in office productivity in 1981. There will, however, be some gain made in 1982 and in subsequent years. But the real gains will only be made when people begin to put everything together and understand how to see these systems productively.

Wright: But it will be a gradual increase. There remains a lack of understanding on the part of the users. They are not quite sure what they are trying to accomplish. Users, in that respect, are not particularly sophisticated yet. This situation is partially caused by the people in the data processing department who historically haven't talked very much to the people in the office manager's department or the word processing section.

Progress will only be made when these people start to discuss their needs and to explore ways of using the computer to satisfy those needs. Then they can tell the vendors, "This is what we need."

As it is now, the vendors decide what works best.

Sommerfield: During 1981, major manufacturing segments of our industrial society will continue to attempt to use the computer in integrated manufacturing systems. They will also attempt to involve more nontechnical people in the planning phase.

I think they will be surprised at how sophisticated these nontechnical people are in their degree of understanding of computing systems. Computers have been around, and the nontechnical person will insist on certain func-

(Continued on In Depth/4)

William **Engle edits the** *Applications Software Reports* **and** *Systems Software Reports.*

Jan Wright oversees *Plug-Compatible Peripherals Reports, Financial/Retail Systems Reports* and *Office Systems Reports.*

(Continued from In Depth/3)

tions from "his" computer. This will cause the disappearance of that pseudo-mystic veil that data processing people have built around their work. The data processing world is going to become more open to everyone in the business planning and manufacturing environment.

Another event we will witness during 1981 is the evolution of the conceit that information is a commodity of high value. Management will recognize information as a vital resource, and they are going to start managing it more carefully. Consequently, this will have a favorable impact on profitability and, certainly, on productivity.

Industry is also going to spend much more money on educating and training people in the use of information as well as understanding the value of that information in relationship to the computers. Increasing understanding of these elements in all levels of employees will dictate that management can no longer train a person to do his job without educating that person about the effect of his job on the total system. As a result, the finance people will not be able to operate by themselves anymore. Planning functions will have to be integrated with the sales department. Sales estimates will have an impact on several areas of the business. And the computer-based information system within the manufacturing environment is going to play an important role.

Engle: There is another level that also has to be addressed. The user departments operate a lot more independently of the data processing department.

Traditionally, applications problems were defined and the data processing person went to his programmers and defined the objectives. The programmers then began the laborious process of creating lines of code. This is a very slow process. When they are done and the program checks out, they go to the person who is going to operate the system and start training him.

New systems available now will allow users, who have already been described as being more sophisticated, to do the very things that it took the expensive programming staff so long and so many bucks to do. That represents a big trade-off to me.

These user-friendly systems allow lower level people to operate in much the same manner as the programmer. That's a big process that you are cutting out of the middle, and that's where the productivity gains, in terms of the total company, will come.

"Integrated systems" has also become a buzzword. What advances do you see there?

Wright: People are starting to realize that they shouldn't have separate word processing and data processing systems. In reality, what we are talking about is information processing. Even if we are in different departments, we are still in the same company, and we are all basically concerned with the same information. At the very least, we are all using the same kind of output information, although our applications may differ.

It's possible that we could combine some equipment, but the integration that is needed is a method of combining the ways we handle our information base. We need to combine the way we manipulate that information base so that the data processing department gets the information it needs and our department gets the information we need. If we can double up on equipment or use an integrated piece of equipment to do both functions, that's fine. But it's actually the data base itself that has to be integrated.

Cohen: The people who provide the word processing software and the people who have the technological expertise to provide the data processing capabilities will also have to be integrated, and I think that will happen.

There will be a link. Maybe it will be the technological person or maybe it will be the futurist; but there has to be a group of people on the forefront who recognize what it takes to organize information and present it to the people who are using it. This group will also have to understand the capabilities of their particular system. You need that spark between the person who has the need and the people who know the technology. But it's not necessarily a data processing person.

As an example, suppose you are

within a law firm, and the firm, because of the immense amount of clerical activity involved in creating wills, is one of the first users of word processing equipment. Although the word processing equipment is used to create wills, you also want to create something called a "wills data base." This data base would allow you to be automatically alerted to alter wills that are affected when certain laws change.

Under this proposed system, you could have automated filing as well as an information base. That's a hard application. It's almost a cross between a computerized time-sharing applications, where you create a data base with a data base management language, and an automated word processing system, where someone actually enters data in the word processing mode. It falls between the cracks.

Sommerfield: You have hit on a key aspect of this issue. When we talk about data bases in an industrial environment, especially integrated data bases, they are different from the data bases that are created to support activities inside a medium-sized office. The law office is a good example. A law office's organization does not require the same skills that are required in a data base administrator who has large quantities of numbers to crunch along with the tasks of tracking data and providing data security.

The law office is a relatively simple organizational problem of storing information so that it can be used again. It doesn't require a data base specialist. It requires someone who has a specific mind set; a person that I call an information person. This information person doesn't need a technical understanding of the equipment. Rather, he has to be able to look at large chunks of information, compartmentalize them, look at the way people use them and then put them into a usable form.

During 1981, 1982 and after, we will see people come up who have the capability to understand information's use in given environments. These people will be the ones who construct data bases for medium-sized offices.

For example, let's examine the person in a law office who has to assemble a bibliography of all documents that relate to a particular case. The only reason he wants this information is so that when he is preparing his brief, he can recall those things without going through the library and looking up all the citations. All he needs is a short abstract of each document organized in some kind of numerical system. It's no big thing. But not everybody can do that.

Where are these information people going to come from? They will come from the library sciences and academic areas such as literature because of their training in literature searches. In addition, certain office managers who have handled large groups of information in the past will be able to look at information and organize it. You don't need data processing people for this type of task.

These people have to understand the value of the information, be able to compartmentalize it, reduce it to its common elements and format it for their particular system. You see, it's not magic. Once they begin to understand information, these systems will have greater use.

Cohen: I should remark, however, that true integration has not yet occurred. For example, I know a large insurance company that has developed a distributed network using workstations and a central memory area. It also uses the workstation terminals to communicate with a time-sharing service, but the two services don't talk to each other. In other words, the information that came from the time-sharing service cannot be used in the word processing mode. Although the company is using the same equipment for two distinct purposes, it hasn't really bridged the gap between creating a data base using a large computer and taking that information and applying it in a word processing application.

Campbell: The major problem in this area is that we are using a term, "integrated systems," and are relying on data processing systems that are highly dependent on applications programs. But there seems to be almost a void in the area of applications programs. I don't visualize any way that this void can be appreciably dealt with in '81.

Will these applications programs be

(Continued on In Depth/6)

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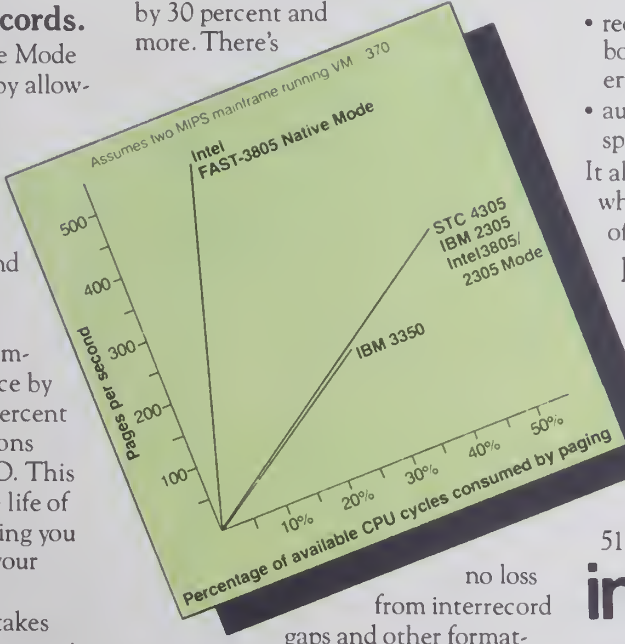

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(Continued from In Depth/5)

developed in-house, or will that be too expensive?

Engle: There are programming aids you can buy now which will make your programmers more effective. That's one way they could go, and these aids will certainly be used. The big thing is, however, not a productivity aid. It's a shift in the whole way of doing business. That shift will see the end users doing the tasks the programmers used to perform. It will increase productivity across the industry very greatly, but it will not mean that programmers are going to be more productive. I think that programmers will gradually have to become supervisory personnel.

Hauserman: I tend to think along the same lines. Most of what is happening now, as far as office systems go, is geared more to the nonprogrammer or, if you prefer, the nonsophisticated user. This is the major element behind the integration of word processing and data processing. People would rather see words than code or symbols and numbers.

It's also an economical move. With future integrated systems, you won't need to know, for example, the intricacies of data base technology. It seems obvious to me that the integration of word processing and data processing is geared toward the nonprogrammer who is becoming more and more involved in the computer environment.

Systems are already available for that application. They take on-line program development, which is the most complex approach, and automate it. A good example is the Taps software. With this software, just about anybody can design on-line, transaction-oriented systems. You sit down, the system prompts you through the procedures and you just tell it, functionally, what you want.

The end user can sit down and play with the system for a while and generate a program. If the result isn't the program he wants, he can create another one complete with screen designs. The bottleneck in any system has always been the screen designs anyway.

Won't the data processing people feel unsure about relinquishing control of the applications area?

Engle: Software continues to stick out like a sore thumb because it is becoming a greater and greater portion of data processing expenses. Management, therefore, is going to look at the data processing budget and say, "What am I getting out of it?"

I think companies will move strongly toward the methodologies that take this "handcrafted art" or "cottage industry" called software and place it in the hands of functional people.

Presently, we have this middleman, a technical programmer. The trend has already started, and it's going to accelerate, where the middleman can be removed from the development process.

Cohen: The head of a software division in a large company said that his dream was, just as you were saying, to push the applications programming into the end user departments. This would allow him to use the data processing budget to actually solve the types of problems that require the expert data processing professional.

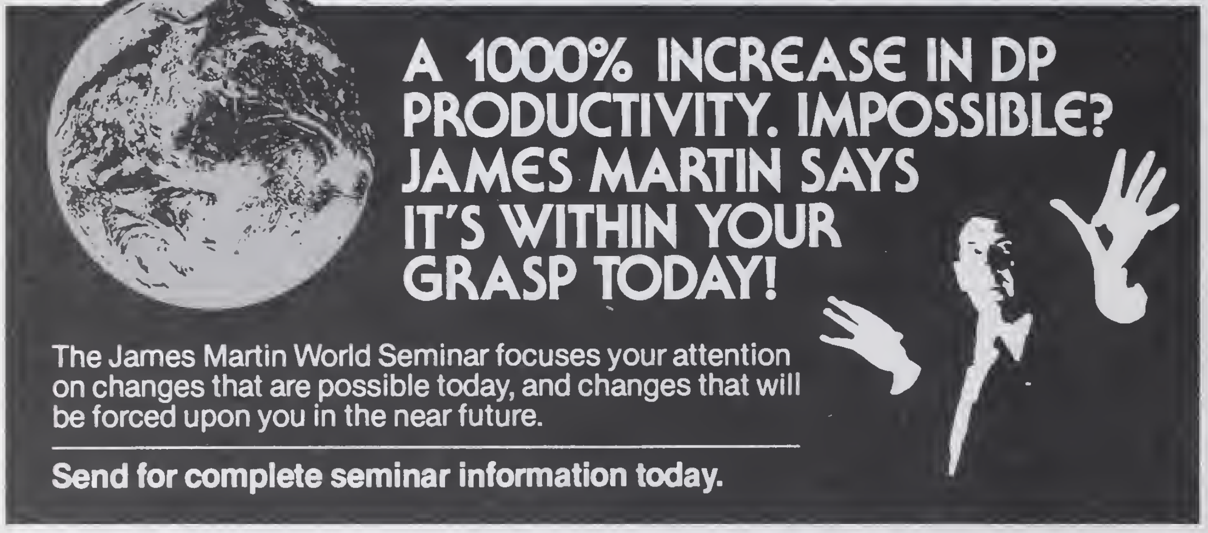
Krefft: Certainly, the end user understands his applications better than anyone else does.

Engle: Someone will be sitting on top of this process determining the best way for the company to go in terms of data processing. But the data processing people don't have to have every little cut, hammer and saw in their department and determine the exact way everything that comes down the line will be crafted.

Will the proposed reorganization of AT&T have an effect on the industry?

Campbell: 1981 is too early for AT&T. In 1981, AT&T will be busy determining how it should reorganize and what business areas it should be addressing based on what it anticipates as the ultimate action of the Congress. Its proposed systems, like ACS [the Advanced Communications Service], won't be available in '81. We probably won't see them in '82 or '83 either. In the meantime, however, more and more carriers other than AT&T are filling the gap. I don't think that AT&T,

(Continued on In Depth/8)



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(Continued from In Depth/6)

by itself, is going to represent any significant change in the industry in 1981.

Sommerfield: One of the areas that AT&T will begin moving into during 1981 is what I call the knowledge business. It already identifies itself as being in the knowledge business, but it will further define itself as an information carrier. The real question is whether it will gather the information itself and put it in its own data bases before sending it out over the wire or whether it will buy that information from somebody else. In either case, however, it will be selling that information. To a certain extent, it already is with Dial-A-Joke and sports news. It's going to become more sophisticated, however, through the use of technologies such as Viewdata and videotex that are available now.

There will be an expansion of the use of directory assistance in 1981. This service will be available, in some areas, on home video screens. AT&T will also put the Yellow Pages up on video screens via telephone lines, and it will update them frequently.

At this time, the newspaper industry is running scared of AT&T. Although AT&T has denied that it will move into the newspaper business, I ask if there is any difference between the classified section of the newspapers and the classified section called the Yellow Pages. AT&T will be in the classified business. It denies that it will be in competition with newspapers, but the newspaper association is spending large amounts of money trying to persuade Congress to pass a bill inhibiting AT&T from moving in this direction.

No discussion of the industry would be complete without projecting IBM's future moves. Any comments?

Sommerfield: IBM's future direction, and I think you will see signs of this in 1981, will be to make a push in the small systems market. Look at some of the factors.

First, marketing channels have already been deployed. IBM has always been a better marketing company than a technology company, and it has deployed some interesting marketing channels during the last couple of years. It now has small business training facilities, where potential users can obtain information about computers for small businesses, in all the major urban business areas in the U.S. Yet, IBM hasn't really made a penetration in that market.

In addition, IBM has literally hundreds of people who are trained to sell small computers. It has also spent millions of dollars on advertising its capabilities in the small business area.

The channels for marketing small computers are ready, but they haven't had an effective push. That is very uncharacteristic of IBM. IBM would not lay out all those bucks to establish the marketing channels and not utilize them. IBM will, therefore, most likely move in that direction.

Are there any areas that haven't been covered?

Krefft: I tend to agree with the broad trends that everybody has identified. I would, however, like to focus on a different area — voice technology.

There are some predictions that can be made in that field, but I should provide some background first.

Voice technology breaks down into voice input and output. Voice output is an established technology, and speech reproduction is achieved by recording or synthesis techniques.

Voice input is immensely more complicated, and there are tremendous problems. Work has already started on separated words, which are somewhat easier to recognize than continuous speech. Continuous speech, as you might imagine, has some horrendous problems. When people run their words together, they may sound like different words. For instance, if you say "in compatible systems," it may end up sounding like "incompatible systems."

Speaker independence is another problem. An 80-pound girl from the deep South does not sound anything like a lumberjack from Minnesota. Background noise is yet another difficulty. In addition, it takes a tremendous amount of processing to interpret a very small amount of speech. Basically, this is an area where advances in technology will have a direct effect.

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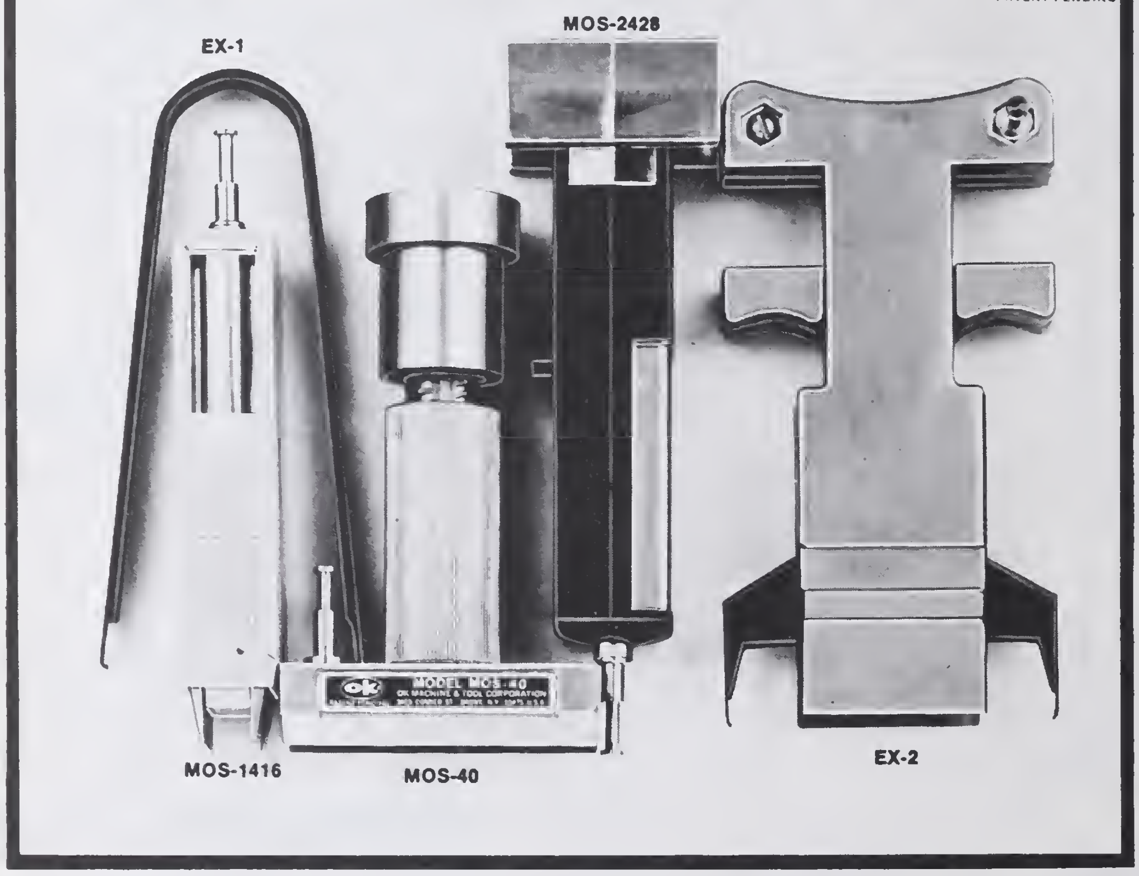

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A Look at Local-Area Networks

BY MARK A. DINESON

Approaches to providing simplified and flexible data services in buildings and on campuses have developed rapidly in the past decade. The numbers of mainframes, minicomputers, microprocessors, terminals and intelligent control devices now growing in all sectors of industry are demanding that networks provide a more capable and expandable pathway for the ever-increasing traffic between and among the system elements.

We all remember the days when an information outlet meant a multipin connector on a very large wall plate in the office and a dedicated service technician in every closet (see Figure 1). This situation improved, of course, with the parallel developments of private automatic branch exchanges (PABXs) and star networks. The star network utilized dedicated pairs of wiring to serve, in many cases, both telephones and data. The data switch version of this type of network served only data. Despite its relative simplicity and the abundant availability of twisted pairs within existing buildings, network services offered to users were limited in terms of speed.

The cable network could only support data rates in the range of 300- to 9,600 bit/sec, and the quality of the data transmission was generally one error in 100,000 to one error in one million. In many cases, this error rate required that error correction be accomplished in the host. This was just another task that loaded the host with more and more communications processing. In some cases, this was done at great expense in the central intelligence of the star network.

One of the major drawbacks to the expansion of these types of networks has been the initial cost of the central equipment required to switch the various twisted pair linkages to their destinations. For a network designed for 1,000 users, but only used at the initial point for 100, a frame capable of handling the total amount had to ordered. In many cases this cost was marginally (if at all) justified.

Baseband Coax Approach

Baseband coaxial approaches to outlet-type systems, such as IBM's 3270 cluster system, basically used a single coax feeding each terminal. Although the response to the terminal was highly desirable from the user's point of view, with high-speed data filling the screen quickly, the massive cabling required for a large number of terminals became a nightmare.

A "contention bus" developed during the '70s extended the geographic coverage of these networks and allowed the use of one branching coaxial cable to feed many information outlets in series. But because of the electrical characteristics of the network, the contention bus suffered from vulnerability at the tap point.

The baseband networks now under development and in production go to a great deal of effort to isolate the user or the user computer from the cable itself. Since the cable is electrically continuous, a short circuit at any user point could bring the entire network down. To reduce this risk, active trans-

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An example of the earliest form of information outlet, this diagram shows how synchronous and asynchronous links have been served. The connector used at the wall plate is a standard EIA RS-232-compatible type. The distances served, without limited-distance modems and multiplexers, may be up to 1,000 ft at low data rates. The diagram shows how cumbersome this type of configuration can be with a large number of devices. If a higher speed data or video link were needed, more outlets and more cable would have to be installed.

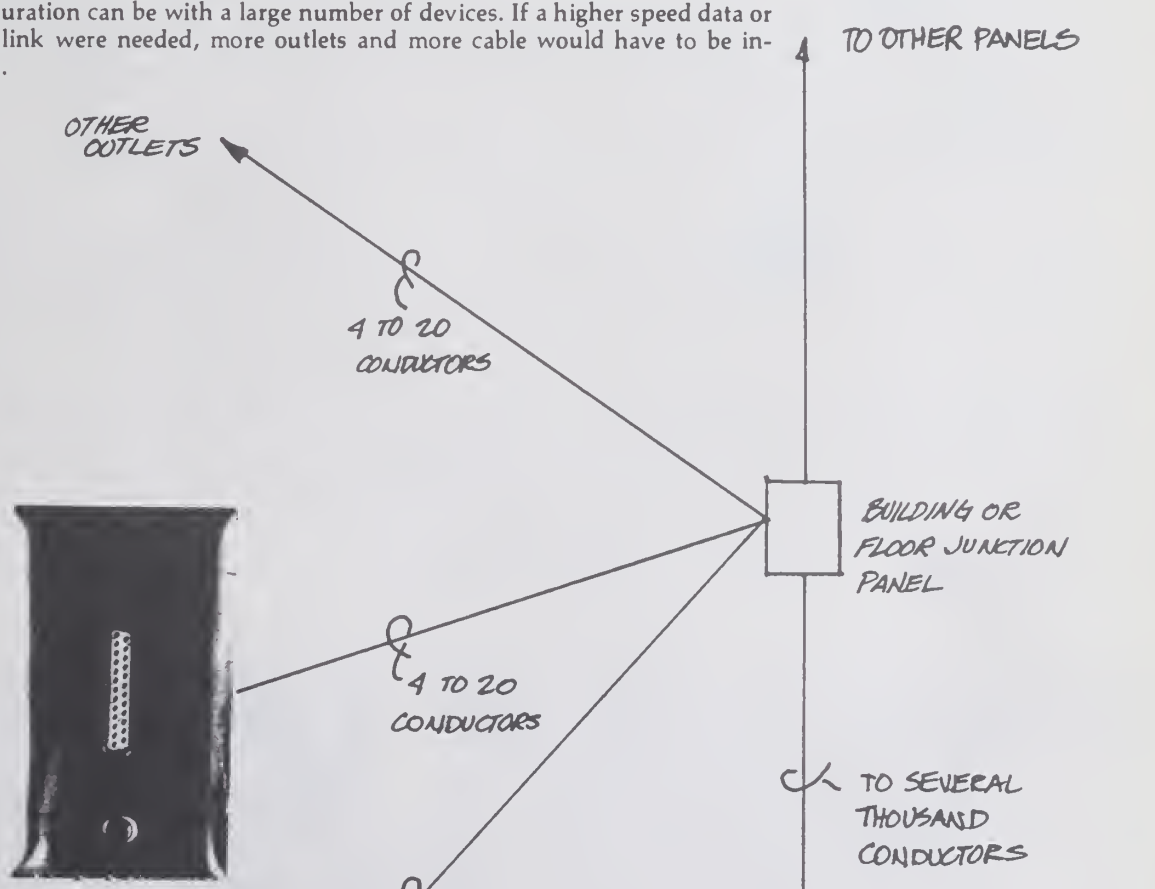


Figure 1. Hardwired Outlet System

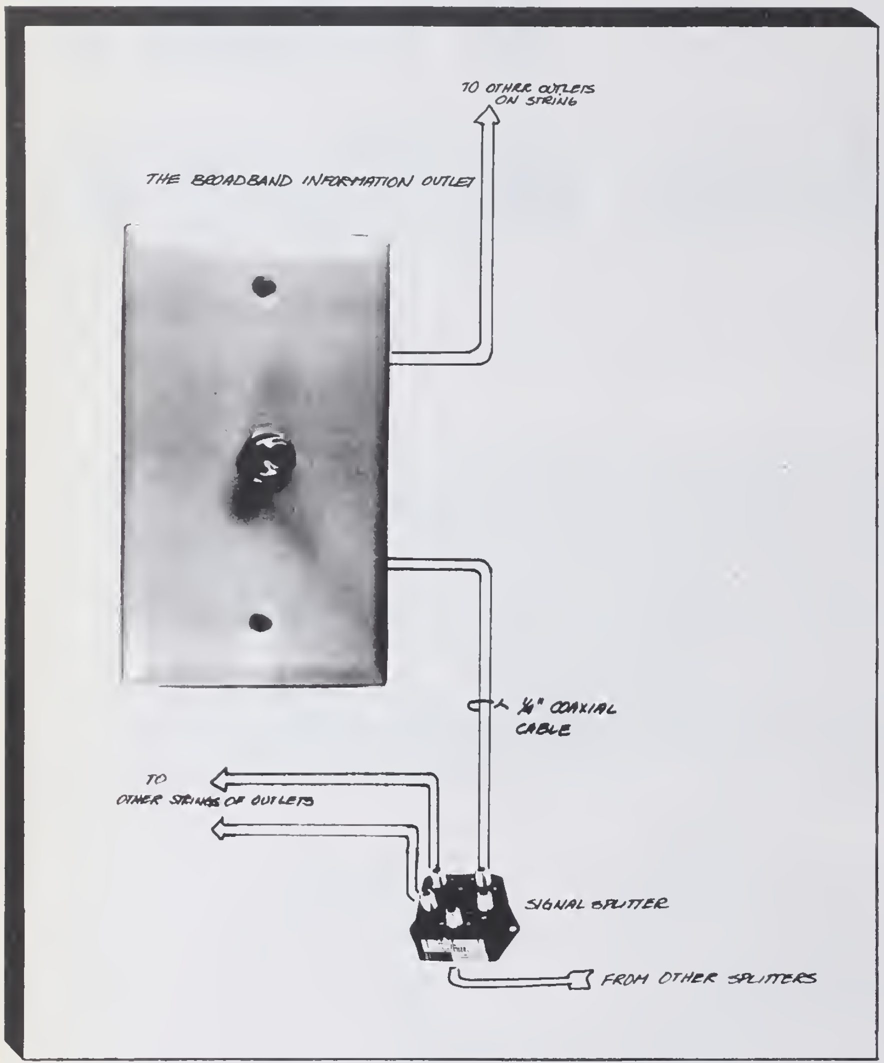

TO OTHER OUTLETS ON STRING
THE BROADBAND INFORMATION OUTLET
¼" COAXIAL CABLE
TO OTHER STRINGS OF OUTLETS
SIGNAL SPLITTER
FROM OTHER SPLITTERS

Figure 2. The Broadband Information Outlet. The layout of a broadband outlet system is much simpler than its hardwired counterparts. As shown in this diagram, the broadband net expands by dividing and building. The outlet shown allows a user to "plug in" a network interface with just one coaxial connector. The outlet provides the "room" for servicing data, voice and video, while physically and electrically isolating the user from the network. This feature protects both the network and other users from abuses in any one office. Since the topology is a branching tree, the conduit and facilities requirements are minimal.

(Continued from In Depth/9)

ceiver units have been placed or designed to be placed in wall receptacles, above ceilings and in other places away from the user to protect the network from abuses.

In many baseband coaxial systems the single stream of data bits (the single logical channel) limits the service offerings by requiring that the single stream be controlled by a single mechanism. Since no one mechanism — time division multiplex (TDM), time division multiple access (TDMA), carrier sense multiple access/collision detect (CSMA/CD) — satisfies all needs, the single stream seriously limits the ability of a network as a whole to address the multiple and varying requirements of many users.

Fiber Optics

Fiber optics, generally described as the wave of the future, offers a tremendous variety of advantages. The high data rates transportable on a fiber-optic link can reach one gigabit or more. Unfortunately, the fiber technology does not currently allow for inexpensive, commercially available multidrop operation. It is anticipated that fiber will become a major factor in multidrop single-thread networks within the next decade, but currently it is not usable in a bus-oriented network because of the limitation in multidrops.

Fiber is, however, tremendously valuable for long-distance trunking, isolation from electrical fields, transmission between computers at extremely high rates and in situations where (end to end) security from interception is crucial.

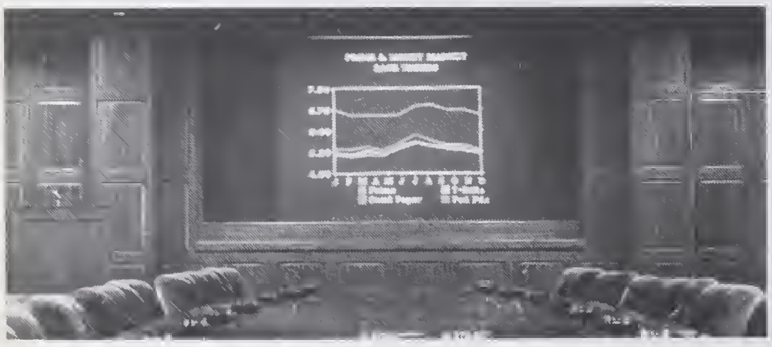
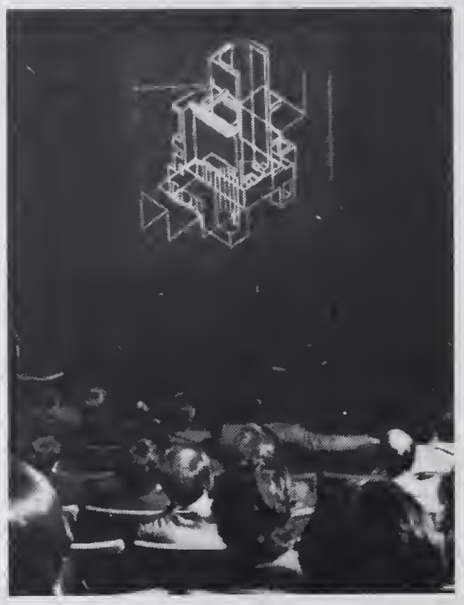
The ideal "network utility outlet" or "information outlet" would possess some very specific features to make it usable in a wide variety of real-life situations. For example:

1. The "outlet" on the office or plant wall should be a virtually transparent link to any other outlet in the building or campus independent of any equipment attached to it.
2. The information outlet should be virtually immune to damage in the office, yet be extremely simple. Ideally, the tap in the office should be totally passive, and the equipment that attaches to the outlet should be the only point of failure within the office.
3. The outlet system must allow various types of data services to be provided. It should also provide for facsimile, digital and analog voice as well as video signals to be transported on the network.
4. The outlet system should allow users to move from area to area without interruption, simply by unplugging the connection of their interface unit and their power plug and then moving to another area and plugging in. This implies no closets full of colorful wire, no technicians in the closets and no one required for full-time moves and additional services.
5. The outlet system hardware should be low cost, ideally less than $50 per office outlet.
6. The devices to provide an interface to this transparent network must be available at modest cost to provide connections of various types of equipment to the outlet system. Ideally these devices should be able to be installed one at a time to avoid the massive cost of a central control system.
7. The system must be expandable, able to grow geographically and in service as the office complex, plant research center or campus does.
8. There must be a means for an individual user in the network to access services and other devices outside his own network. A gateway must be provided to communicate down the street or across the world.
9. The outlet system should be built on a well-known technology so that local contractors can construct and maintain the network and vendors can design equipment suitable to operate on a network of standard characteristics.

There is such an "information outlet" system — broadband. It addresses all of the requirements listed above for a simplified network structure (see Figure 2). It is based on cable television (CATV) technology, with literally thousands of skilled installers trained and available worldwide; the devices to transport data, voice and video are available in many different levels of sophistication from several vendors, with many new vendors feverishly working in the wings on products to be offered in the near term.

Not for Everyone

With all these features, installers, vendors and support, broadband is *not* for everyone. In certain situations, this technology is not a particularly cost-effective solution. Let's take a simple

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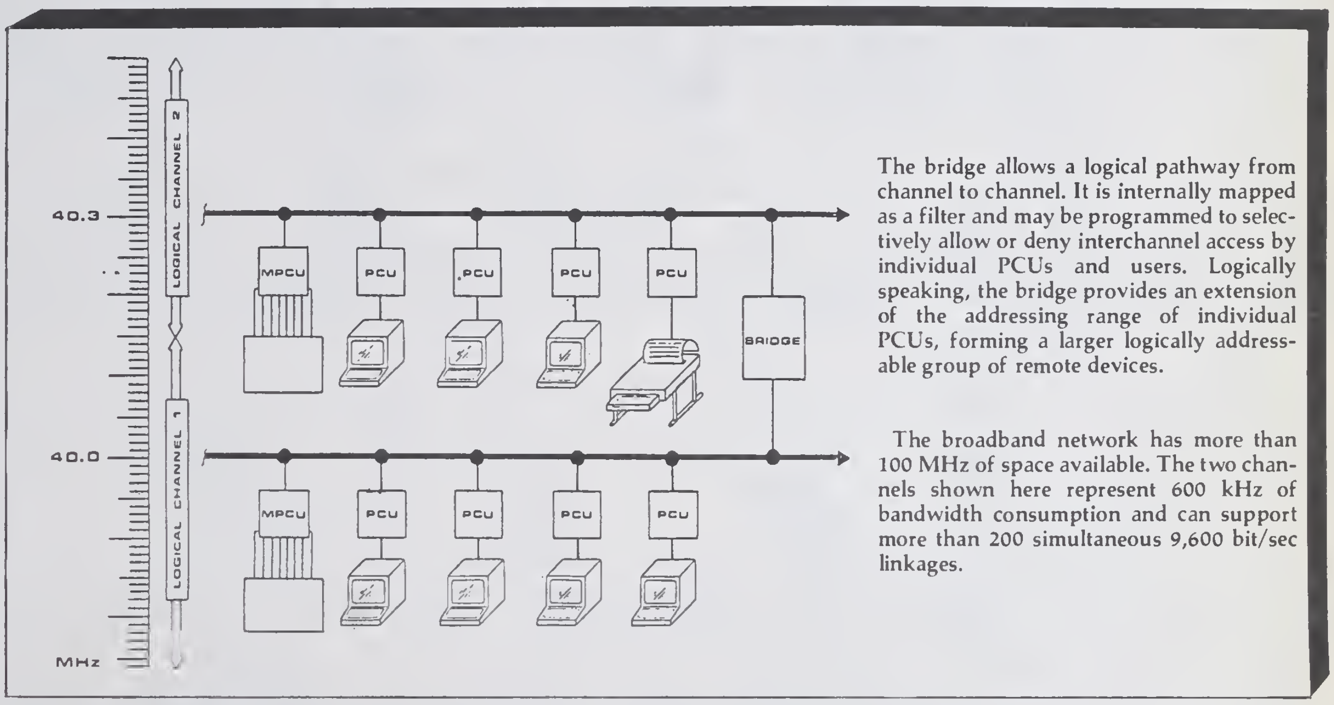
example.

The cost of broadband cabling (coaxial cables) ranges from 70 cents to $3 per installed foot, depending on environment, method, aerial or underground-location, or in-building installation. The interface devices (modems or packet communications units [PCU]) may cost $500 or more each, with one at the host port and one at the terminal. Video interfaces may run from $1,200 to $2,000.

In this example, the cost of the medium, modems and service is more than the cost of dedicated cable (twisted pairs) and limited-distance modems to drive the terminal.

From this cursory examination, we conclude that broadband may not be the most cost-effective solution in the following cases:

1. When the entire network is in one cabinet. The cost of network transceivers, coaxial cables, taps and so forth is not justified when the geographic extent of the network is very small. In such cases, the more conventional approaches of a parallel bus or serial bus operated on baseband-type cables may be more effective.
2. Where the network services a small (less than 150,000 sq ft) area with only a small (less than 100) number of identical devices that do not require much in connective ability or error control.
3. Where device and network growth are not sufficient to justify this type of investment, especially in areas where there are very few moves and additions to the systems serviced by an existing network.
4. Where there is no mix of services, for example in a brokerage office with 20 terminals and a minicomputer or multiplexer. This situation is better served cost-wise in conventional twisted pair approaches.



The bridge allows a logical pathway from channel to channel. It is internally mapped as a filter and may be programmed to selectively allow or deny interchannel access by individual PCUs and users. Logically speaking, the bridge provides an extension of the addressing range of individual PCUs, forming a larger logically addressable group of remote devices.

The broadband network has more than 100 MHz of space available. The two channels shown here represent 600 kHz of bandwidth consumption and can support more than 200 simultaneous 9,600 bit/sec linkages.

Figure 3. Logical Operation of Hierarchical Local-Area Packet Net on Broadband. This figure illustrates the channelization of the broadband medium. Shown are several "logical channels" upon which individual contention packet nets operate. In the lower example, each PCU may make a virtual connection to another PCU and terminal or to a port on host computer A. Connections may be interactively controlled by the terminal or host attached to the PCU, or they may be made automatically by preprogramming a fixed connection. In the logical channel in the upper portion of the figure, host B may alternate connections between the 9,600 bit/sec CRTs and the 300 bit/sec printer.

Figure 4. Broadband Information/-Communication Interface. Shown is one of many products that have emerged to serve the broadband network interface function. This PCU, manufactured by Network Resources Corp., features a channel-selectable network transceiver backed up by a microprocessor-based internal communications system that formats and addresses packets, controls their transmission on the network utility and provides both global and local error and flow control. The unit interfaces up to two EIA standard devices to the broadband net, using X.28 CCITT-similar user protocol. Devices are available for other network services including point-to-point, high-speed synchronous, voice, PCM truncking and video. X.25, packet voice and virtual trunk FDMA equipment are currently under development.

Where there is a mix of high speed, low speed, varying protocols and connectivity activity requirements and where the regional data center or a larger office complex has more than 100 smart terminals, a mini or two, and a gateway or network node, it is a whole different story.

Logical Choice

When facilities' requirements are a mix of services, where a fairly large plant must be covered and when mobility for devices is needed, broadband local area computer networks are almost certainly the logical choice. In a few cases, the extreme shielding available through the use of broadband coax in secure systems has been the basic reason for selection in its own right.

The latest development in devices for interfacing to these networks is the hierarchical packet network (see Figure 3). This technique transcends simple point-to-point and multipoint as well as TDMA schemes for supporting large numbers of asynchronous devices, especially low-cost (less than $2,000) terminals. On a segment of spectrum space, only one-fifth that available on a single broadband coaxial cable, this network system allows more than 10,000 users and their hosts to intercommunicate — not just host to terminal, but virtually any point to any point.

This is accomplished using CSMA/-CD mechanisms, where each interface unit contends for "space" to transmit an addressed packet of data onto the logical channel, "one of many," to which it is attached. The interface unit listens for a point in time when the channel is inactive, then seizes the channel and transmits its data.

The data is packaged in a packet, which frames the character or group of characters being transmitted on both sides. The packet itself contains the address of the data source as well as the destination. It also contains (depending on the instantaneous state of the network itself) information allowing data integrity and type of code to be indicated in the packet.

The packet, once lofted onto the cable channel, travels to all connected outlets. Those interfaces selected to this particular channel listen for their address. When proper destination is detected, the entire packet is accepted and the encapsulating frame is disassembled by the receiving interface device. The data is then passed on to the attached terminal or host.

Method of Operation

The method by which these units operate is virtual-circuit oriented. When a terminal wishes to "set up a call," much as it might in a telephone network, it uses a CCITT X.28-like convention, allowing it to place the call to the destination. This is part of the full connection ability discussed earlier. Each interface unit (PCU) consists of a user interface (one, two or eight); a microprocessor that handles user-mechanism-protocol processing; and a frequency-agile (channel-selectable) modem (see Figure 4). The modem (transceiver) can select and operate on any

(Continued on In Depth/14)

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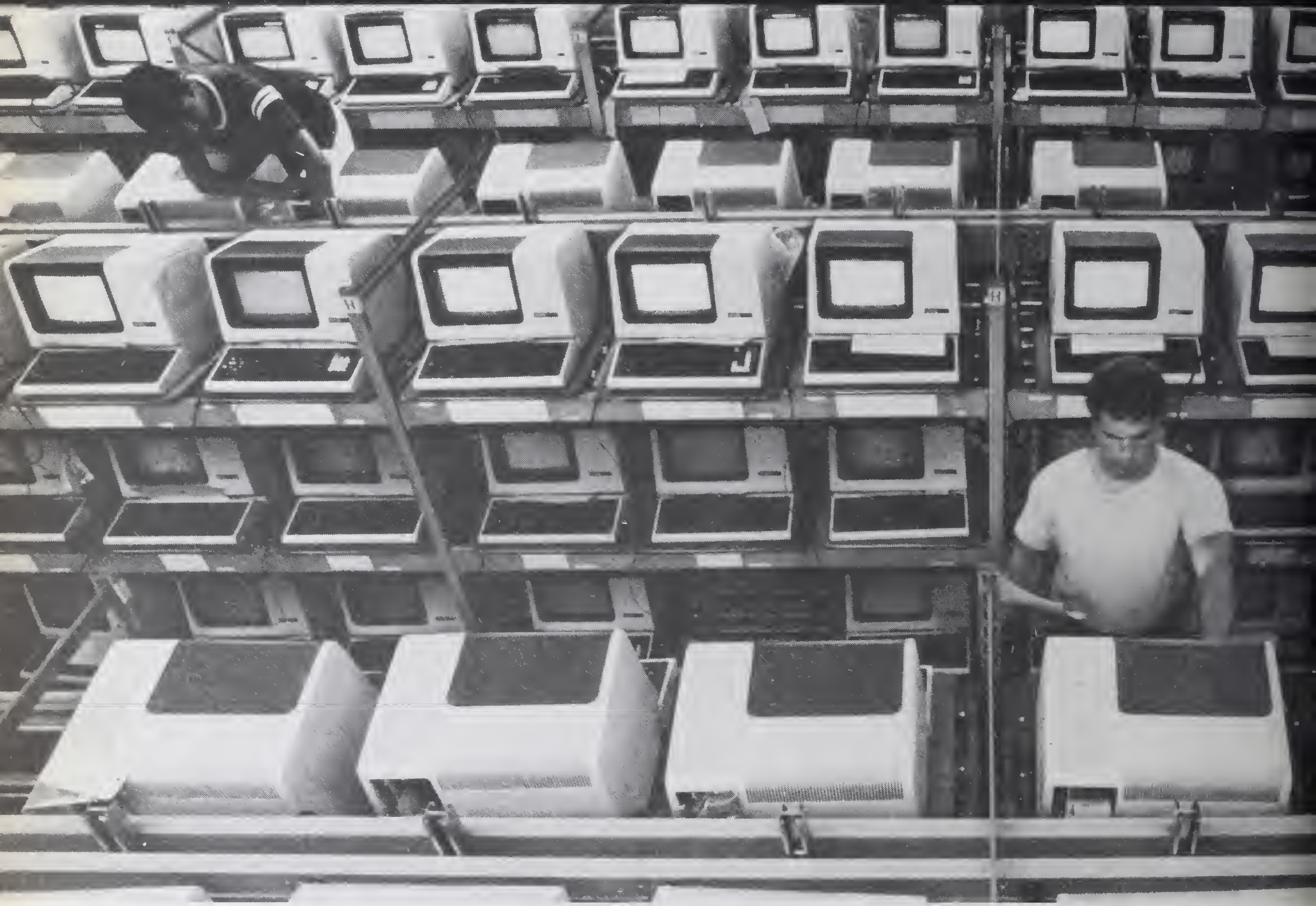

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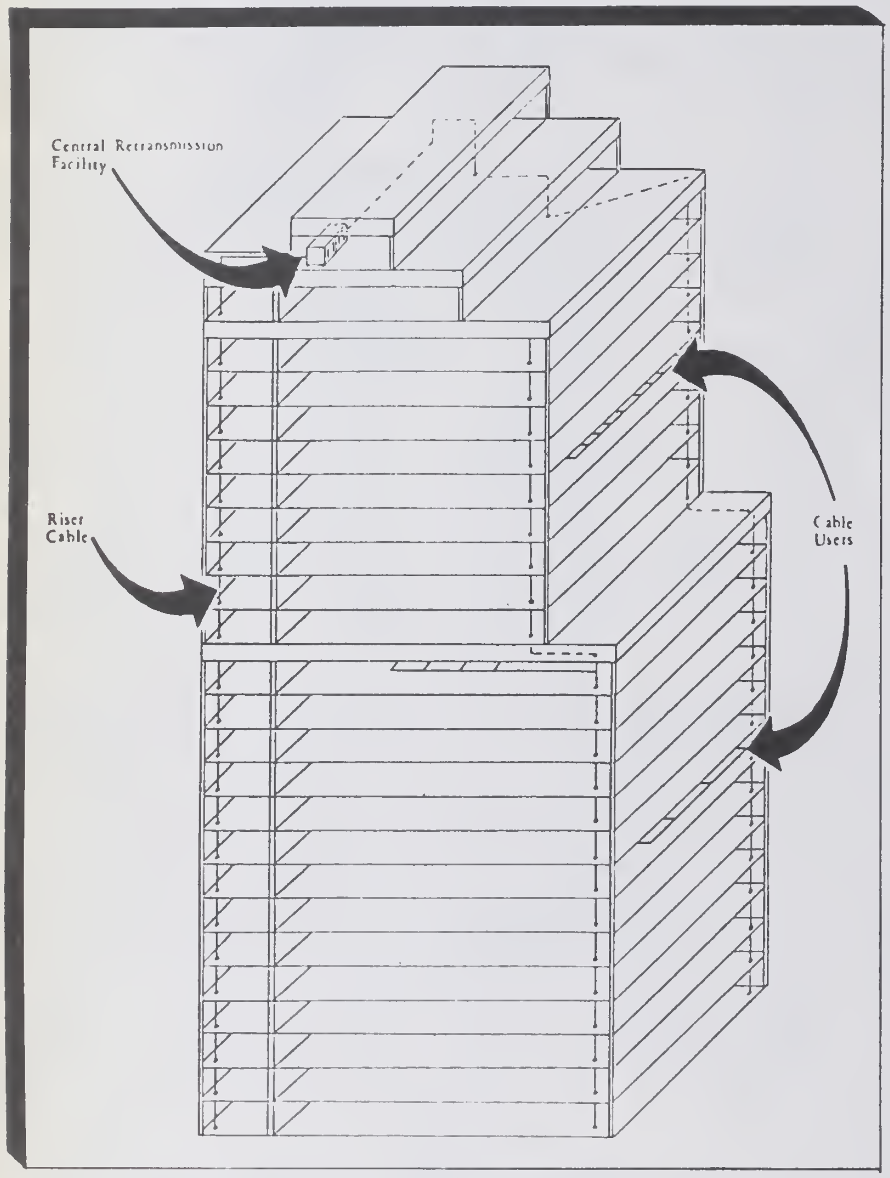

Figure 5. High-Rise Information Network Cabling Simplified. A single branching cable outlet network feeds the building through a riser cable that branches to outlet groups on each floor. Outlets may be placed in the wall or floor or in landscaped office partitions.

(Continued from In Depth/11)

one of 120 channels on the coaxial cable system.

The microprocessor allows the interface unit to request, establish, interrupt or disestablish a virtual connection on command by the terminal. This connection may be made on any one logical channel to up to 250 other devices on the channel. In terms of network performance, approximately 100 simultaneous circuits (200 interface PCUs) may operate on each channel in an asynchronous manner at 9,600 bit/sec with a 10% duty cycle. With 120 channels available, that's a lot of service.

Since the PCU basically inputs and stores (as well as the reverse, of course) characters from an asynchronous Ascii device, buffers them and controls their transmission onto the bus, speed matching is automatically handled. This means a 9,600 bit/sec port on a computer can be accessed by a 4,800 bit/sec or 1,200 bit/sec device and then switched to another 9,600 bit/sec device again. The PCU also allows the use of plug-in security additions (with a key distribution unit) utilizing the National Bureau of Standards (NBS) Data Encryption Standard (DES) coding for links requiring security.

Best Combination

The efficiency of these devices on the channel (greater than 95%) represents the use of the best possible mechanism-protocol-hardware combination to suit a particular service, in this case asynchronous terminals, using only the section of bandwidth required for the service. This leaves a great deal of "spectral room" for other network services. The other network services may be synchronous point-to-point, multipoint, high-speed, burst, host-to-host and so forth.

The hierarchical structure of the network is one of many (120) subchannels, each of which is a small, independently operated network in its own right. The subchannels may be logically bridged by an internally mapped "filter" between channels, allowing one terminal, for instance, to establish a circuit to any number of other terminals on other logical channels. This extends the addressing range of any individual device.

The next level of network functionality allows the selective transfer and conversion of packet format, a gateway. This is the system allowing one of the many attached devices to request, establish and disestablish long-distance or long-haul communications via public or other private networks (using X.25 protocol standards, for instance).

In addition, technical control and monitoring facilities become highly simplified in this type of network. Because all packets are identified as they pass by on each channel, traffic statistics, functional test commands and medium policing functions are built into a much more compact system. This system is able to output raw statistics and input commands as required with only two major connections — one to the coaxial cable system, the other a power plug.

Other Devices

The other devices available for these networks include high-speed, single-channel packet communications units; synchronous and asynchronous modems for bit-transparent lengths in a wide range of data rates and interfaces; interfaces for audio circuits; interfaces for pulse code modulation (PCM); telephone multiplexers, modulators and demodulators for television signals (both color and black and white); as well as host adapters for the intimate bus attachment of multiple host networks. All these devices may provide services in a simplified, growth-oriented manner, even in very large facilities (see Figure 5).

Several systems organizations can properly engineer and manage the installation, easing the burden on new users and already overtaxed network organizations. Many more are quickly emerging as this technology takes off in the '80s.

Broadband has added a great deal of functionality and flexibility for future uses to the concept of an information outlet. The wide selection of services offered by broadband, the ability of the basic network medium to allow coexisting, independent, movable services and the ability to expand in a simplified manner will contribute significantly to its use as a basic medium and method in many of the private and advanced long-haul networks of the future.

Projecting the use of this technology, it is entirely practical to serve a group of buildings with this type of network, gatewaying to groups of buildings in a section of the city served by the same type of cabling. From this point, the system can become a hub and serve a larger area. At this point, extension from the user outlet on the office wall to a satellite link and into another set of networks in another city is a definite possibility. Not a simple task, but certainly logical.

The capacity of the broadband approach makes this type of usage practical. The fact that most major cities are already wired in an almost totally compatible fashion makes it just a matter of time.

Local-Area Nets: A Short History

By Mark A. Dineson
And Wayne Martson

Local-area networks have developed in a demand-driven environment. In the mid '60s, serious concern in the military-aerospace sector raised the issue of handling large data volumes at high speeds for scientific processing systems. In addition, these networking systems had to support many distributed users in clustered locations.

The knowledge that has been applied to most contemporary local area networks primarily grew from these packet communications techniques developed in the Defense Department Advanced Research Projects Agency Network (Arpanet) of the late '60s. This was a long-haul satellite network used to link university campuses and military/research sites for long-distance data communications. The network provided a new way of sharing remote host resources. This agency is currently engaged in the continuing development of local-area computer networks as a basic building block for satellite-connected modular networks.

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The development of local-area networks has been spurred by the research community and by the evolution of traditional dedicated twisted-pair plants. The result has been the emergence of three basic types of networks: twisted pair, baseband and broadband. These networks are distinguished primarily by the medium upon which they operate.

Development of the Networks

Networks based on twisted-pair media were indisputably the first; they developed decades ago with the introduction of the branch exchange. As the branch exchange concept expanded to private automatic branch exchanges (PABX) within buildings and the use of computers and terminals began to increase, there was an increasing split in networking operations of the telephone and computer. The PABX became the central focal point for telephone services, and acoustic couplers were developed to tie terminals and other devices to existing telephones.

In other applications, dedicated twisted pairs or leased lines became the basis for computer networks requiring more than the limited data capabilities the PABX could provide. Dedicated and leased pairs began their proliferation during the late '50s, with current loops and direct electrical driver devices dominating the connections.

In the '60s, users realized that the limited bandwidth of twisted pairs and telephone-grade lines restricted the performance of their networks. The initial result was the development of an entire industry (the modem industry) based on obtaining the maximum amount of data transfer through this limited medium. During this decade, modems, line drivers, multiplexers, data switches, port contention machinery and compression techniques were developed to meet the ever-increasing need for data flow through this limited bandwidth, but eminently available medium. More than anything else during the '60s, more twisted-pair cables were installed.

More Exotic

In the 1970s, more exotic equipment became available, designed and built to take advantage of existing building cables. The introduction of hybrid voice and data computer branch exchanges (CBX) brought about a great increase in the capabilities of private (local) networks. These branch exchanges are able to drive existing cable pairs near to their limit; and they provide data terminal services at the telephone station location more simply.

Concurrent with the development of CBX were developments of data-over-voice techniques and other schemes, again able to utilize existing pairs through frequency division multiplex (FDM) techniques. FDM allowed data to occupy the upper portion of the bandwidth available on an in-house twisted-pair network, operating independently of the PABX and telephone.

Most twisted-pair networks are built in a star architecture. This allows any high-speed or switching operations to take place at the center, where the bandwidth restrictions do not apply. This worked well when all the computers were in one room.

Baseband Networks

The development of baseband local-area networks began on a large scale in the mid-'60s with the introduction of the IBM 3270 cluster controller and terminal devices. This technique, based on polled screen burst data using master-slave protocols, allowed one coax to be connected to each terminal, up to 32 terminals per controller. This allowed terminals to be clustered with a single multidrop line feeding each controller. Many similar approaches were used by other vendors, utilizing the time division multiplex (TDM) techniques and so forth.

The major advance in baseband networking occurred in the early '70s with the development of Ethernet by the Xerox Corp.'s Palo Alto Research Center. This development was based on many of the techniques learned in the Arpanet and Aloha packet radio experiments in the late '60s, condensed from an open satellite or radio connection to coaxial cable in a building. It uses distributed intelligence to format the data into "letters" (packets) which can be sent complete with destination address and source address, using protocols to control the transfer and flow of information as well as control errors. The medium (baseband coax) allows high-speed multidrop burst communications of these packets.

A contention (broadcast) mechanism is utilized to increase channel efficiency. This new "bus" technique, based on each attached intelligent interface contending for data transmission on the channel, allows greater than 90% utilization of the single bit stream Ethernet currently provides. The architecture of the network is totally distributed network intelligence residing on a bus. This represents an absolute structure reversal of the PABX or data switch architecture in which all intelligence controlling the network resides at one point, fed by limited media.

The late '70s saw development of Ethernet-type networks as well as other designs including Datapoint Corp.'s Attached Resource Computer (ARC) ring network; Digital Equipment Corp.'s Decnet (which is now embracing Ethernet implementations); NBS Net, the network developed by the National Bureau of Standards; the Three Rivers Perk network; and Zilog's Z-Net, to name a few.

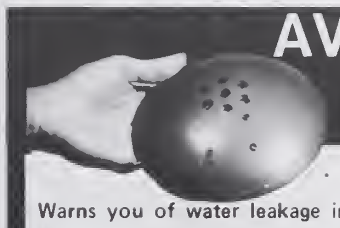
The development of single bit stream, packet/contention-based networks, based on completely distributed network intelligence, is proceeding at a breakneck pace. These networks promise to offer modest, incremental cost, simplified installation and a great variety of user services.

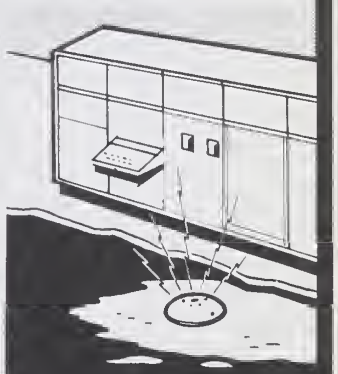
Broadband Local Nets

Broadband local-area networks based on cable TV began their data services with the first FDM systems installed in the early '70s. The initial techniques used were to create many point-to-point or multipoint "channels" on a single coaxial cable, utilizing high-volume production cable TV components as the backbone.

In the mid-'70s, Mitre Corp. de-

(Continued on In Depth/18)





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(Continued from In Depth/15)

signed and prototyped Mitrix, a TDM slotted/bus system capable of citywide data services. This enhanced the number of subscribers per "channel" on the broadband coaxial cable and provided a demonstration of multiple, independent and simultaneous services on the same single coax. These services included off-air television, high-speed point-to-point data services, multipoint data services and the support of potentially large numbers of asynchronous terminal users. During this period, commercial citywide experiments, such as the Warner-Amex Qube system, began their operations.

In the late 1970s, The Mitre Corp. again pioneered broadband with Mitrenet, an Ethernet-like contention scheme utilizing only one of many available channels on the coaxial cable and allowing multiple services to coexist on a branching coax network in higher densities.

Dateline: 1980. The commercial suppliers of broadband-based local-area networks utilizing packet communications techniques and contention mechanisms are finally appearing. Network Resources Corp.'s structured multichannel hierarchical local network scheme termed Localnet and Digital Communications Corp.'s single-channel Paklom became the first suppliers to offer packet/contention-based broadband local area networks.

Work is progressing successfully on packet voice schemes and compressed video that will open up even greater avenues of service offerings for applications such as telephone voice service and video conferencing.

The local-area network stage is set. Product offerings by manufacturers in each area will address the specific needs of users more simply, offering higher performance and more function per network dollar. In the area of twisted-pair operations, enhancements to PABX and the new CBX will support terminals, and in some cases even protocol conversions, in addition to their day-to-day dial-up business.

In the area of baseband local-area networks, highly effective networks supporting hundreds of computers and terminals within a small building or cluster of buildings will provide enhanced data communications for service area diameters of one kilometer or so.

The broadband area will offer very complete services including voice, video and multiple data services to potentially thousands of terminals as well as computers and other devices in local building systems, campus, plant or even citywide distribution schemes less than 50 kilometers in diameter.

Mark Dineson is director of Sytek, Inc.'s Northwest Engineering Laboratory in Bellevue, Wash. He has eight years' experience in broadband local-area network implementation. Most recently, he was with Network Resources Corp., founded in 1979 and acquired by Sytek in 1980. Prior to that, he was with Intech Laboratories of Long Island, N.Y., and Engineered Communications of Santa Clara, Calif.

Dineson holds a B.A. in industrial technology from San Jose State University.

Wayne Martson is director of marketing for Sytek in Sunnyvale, Calif., and a member of that company's executive committee. His current efforts represent a distributed processing alternative using high-speed CPU communications as well as solving terminal-oriented data communications requirements all on the same broadband coaxial cable.

Martson holds a B.S. in electrical engineering and a B.A. in economics, both from the University of California at Los Angeles.

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I'm OK, You're OK, Maintenance is OK

By Gary M. Bronstein and Robert I. Okamoto

Structured methodologies and techniques, contrary to popular opinion, are not driving maintenance programming out of existence. As an industry, we continue to spend more on the maintenance of old programs than we spend on the development of new ones.

We believe that maintenance programming is a rewarding profession and have built an effective maintenance organization at Amdahl Corp. by avoiding many of the pitfalls of traditional maintenance groups.

Engineering software at Amdahl is responsible for the software required to design, develop, test, manufacture and maintain Amdahl's computers. This includes computer-aided design, diagnostics, control systems for the console processor and a variety of software tools for the production and distribution of software and hardware.

Several years ago, software development and maintenance were performed by the same groups. This often produced conflicts in priorities between development and maintenance. To resolve these conflicts, we decided to create two kinds of groups — "development" groups and "support or maintenance" groups.

Traditional Assumptions

There were those who thought this division of responsibilities between groups would not work. Their reasons were what we would call the following traditional assumptions about maintenance or support programming:

- Maintenance is not challenging, rewarding or creative.
- Maintenance requires neither skill nor experience.
- Nobody who was competent would do maintenance for very long.

Their conclusion was that everyone would want to do development and nobody would want to do support.

These assumptions begin to explain why software deteriorates and why maintenance costs are so high. From these assumptions, one can conclude that most maintenance is done by entry-level programmers in an environment where maintenance is considered the most menial of programming tasks.

The attitude that maintenance is "technological janitor work" is part of what Don McNeil termed "The Myth of Software Maintenance" [CW, Feb. 18]. As he went on to say, "It also produces rotten software."

The traditional assumptions conflicted with our analysis of the work itself. Maintenance programming means supporting the needs of existing software users. The work entails a variety of activities, skills, challenges and rewards.

Correction, Enhancements

The two basic classifications of work are correction and enhancement. Correction is the process of isolating and repairing code that does not perform to the original or established specifications. Enhancement is the addition, modification or complete redevelopment of code to support changes in specification or operational environment.

Although the definitions of correction and enhancement are straightforward, the execution of the work is extremely difficult and complex.

Correction activities are often conducted in a Sherlock Holmes atmosphere. Clues are sparse or nonexistent. The environment of problems as they occurred is usually altered or destroyed. A lack of written material or clues forces one to verbally investigate and extract bits of information.

As data and assumptions are pieced together, prime suspected routines are first identified and then scrutinized. Test cases are often run in an attempt to recreate the crime. Finally, the faulty code is isolated and corrective measures are taken.

Enhancement is similar to development in its phases, but the emphasis is different. Both activities require:

- Analysis.
- Design.
- Implementation.
- Testing and Acceptance.

Analysis is the dominant phase in enhancement. Does the enhancement extend the current design or must the design be modified or scrapped? What is the remaining life of the product and how much money should be invested in the enhancements? Are there alternate solutions available? What are the changes? How is other software affected?

What results from this analysis is usually a small project relative to the size of the program being modified. The remaining phases of design, implementation, testing and acceptance are just as important as they are in development, but they are proportionately smaller phases.

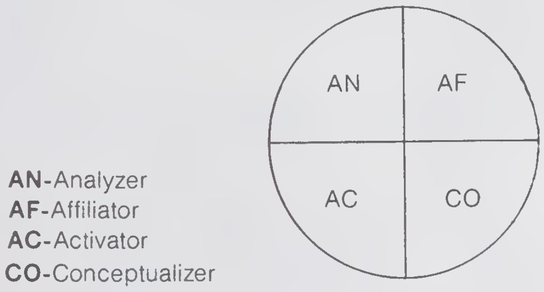
We have discussed the activities of maintenance work and the associated challenges. What rewards come from the work itself?

The triumph of a maintenance programmer over a program bug and the successful modification of an undocumented program illustrate the reward that comes from solving a tough maintenance problem.

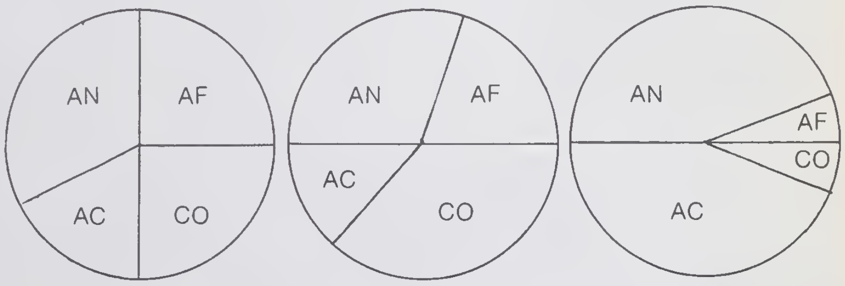
An important difference between maintenance and development is the time frame. Production program failures tend to be "line stoppers." Enhancement or modification requests result from undesirable shortcomings in the software. The reward is frequent and feedback immediate as programs

(Continued on In Depth/22)

Communication Styles

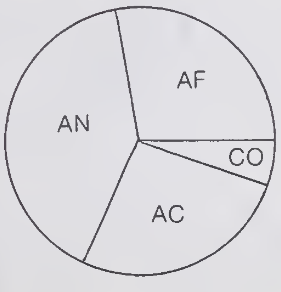


A salesperson must be able to communicate effectively in all styles. His style profile might look like this.



Systems Analyst | Designer | Coder

People good at various phases of programming might have profiles like these.



An effective and satisfied maintenance programmer often has this communication style profile.

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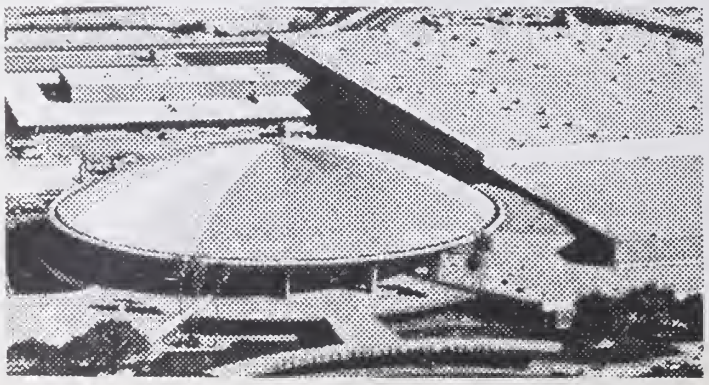

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(Continued from In Depth/19)

run and users are happy.

In maintenance, a programmer often supports more than one product. Or for backup and continuity, a team of programmers supports several products. The reward is variety in products, environments and end users.

Finally, maintenance activities are done on behalf of people. Somebody has a problem that is either keeping him from getting his job done or is making his job more difficult. Helping to remove these impediments for other people can be very rewarding.

Our New Assumptions

The work of maintenance is certainly not a sandbox for neophyte programmers. To put maintenance in its proper perspective requires a new set of assumptions. Among them:

- Maintenance is challenging, rewarding and creative.
- Maintenance requires considerable skill and experience.
- There are competent people who enjoy maintenance and pursue it as a career.

We do not mean that development and maintenance programmers are interchangeable. We mean, instead, that one kind of programming activity should not be considered inferior or superior to another.

Maintenance and development are activities requiring different people and skills. An important part of building an effective maintenance group is to understand those differences and to recruit and organize based upon the requirements of the maintenance job.

The Maintenance Programmer

The ability to make good, sound judgments depends on the experience and technical expertise of the maintenance programmer.

The maintenance programmer must be able to identify with the needs of the end user. This means understanding the operational environment and what the user is trying to accomplish with the software. The maintainer must also put on a development hat. To best understand existing software, it is important to understand the style, habits, idiosyncrasies and thought processes of the responsible developer.

The maintenance programmer must be technically versatile. The ability to work with different equipment, programming languages, styles, tools, users, environments and documentation is required.

Psychic Functions

In addition to the technical skills, the maintenance programmer must have the right balance of what experts refer to as psychic functions or communication styles. Psychologist Carl Jung identified four basic psychic functions inherent in everyone. These functions are thinker, feeler, sensor and intuiter. These same functions are called communication styles by others and are labeled analyzer, affiliator, activator and conceptualizer respectively.

The styles reflect profiles of attitudes, assumptions and actions resulting from people experiencing things differently.

For example, the analyzer makes judgments about the relationship of things and places high value on facts, figures, data and reason. The analyzer would normally be described as analytical, organized, rational and thorough.

The affiliator places value on personal relationships. Adjectives appropriate for the affiliator are perceptive, patient, adaptable and supportive.

The activator is concerned about what is "actual" at this moment. The time frame is the here and now. Descriptions of the activator are assertive, objective, energetic and resourceful.

Finally, the conceptualizer is concerned primarily about the nature of things in terms of their significance and meaning. The conceptualizer places high value on ideas, concepts and theories. Adjectives describing this style are imaginative, creative, idealistic, original, abstract and innovative.

While there can be pure analyzers and pure affiliators, most people are a combination of styles (see figure). The activator supports the imposed time constraints. The analyzer must control the work — organize, define, resolve and implement. The affiliator is the supporter, the hand-holder, the one who can patiently listen, the one who is flexible and perceptive.

The characteristics of the three styles

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will sometimes conflict. It is on these occasions that the experience and skills of the maintenance programmer determines which must prevail.

Our experience has shown that technical skills and the communication style profile required of the job are important in selecting people for positions. Matching the job and communication styles required is a tool in our recruitment and selection process.

An additional important factor contributing to the success of the maintenance programmer is the environment in which the work is accomplished.

Maintenance Environment

Maintenance programming has existed in a social and technical environment that is a direct outgrowth of the traditional assumptions we have encountered. In this environment, maintenance programmers have been unworthy or "not OK." They have generally been paid less and received less recognition. Little attention has been paid to their orientation, training and professional growth within a maintenance group. They need only follow in the footsteps of the developer.

Similarly, the need for maintenance programmers to apply standards and methodologies has been ignored. There are few tools to deal with the special problems they encounter.

An attractive environment for maintenance programming is required if a stable, experienced group is to exist. That environment should support and reward people for excellence in what they do well and what they enjoy doing.

In our environment, we have not made distinctions between development and maintenance programmers in either compensation or titles. There have been employee-initiated transfers in both directions between development and maintenance organizations.

A recent survey of the informal power structure of the organization disclosed that each group thought it had the most informal power. This seems to say that no group considered itself "second class."

More Training

Maintenance demands more orientation and more training than other programming activities — especially for entry-level programmers. One factor is the greater variety of work. Another is the fact that the programs being maintained were developed by others and many have been subsequently modified before reaching their current state.

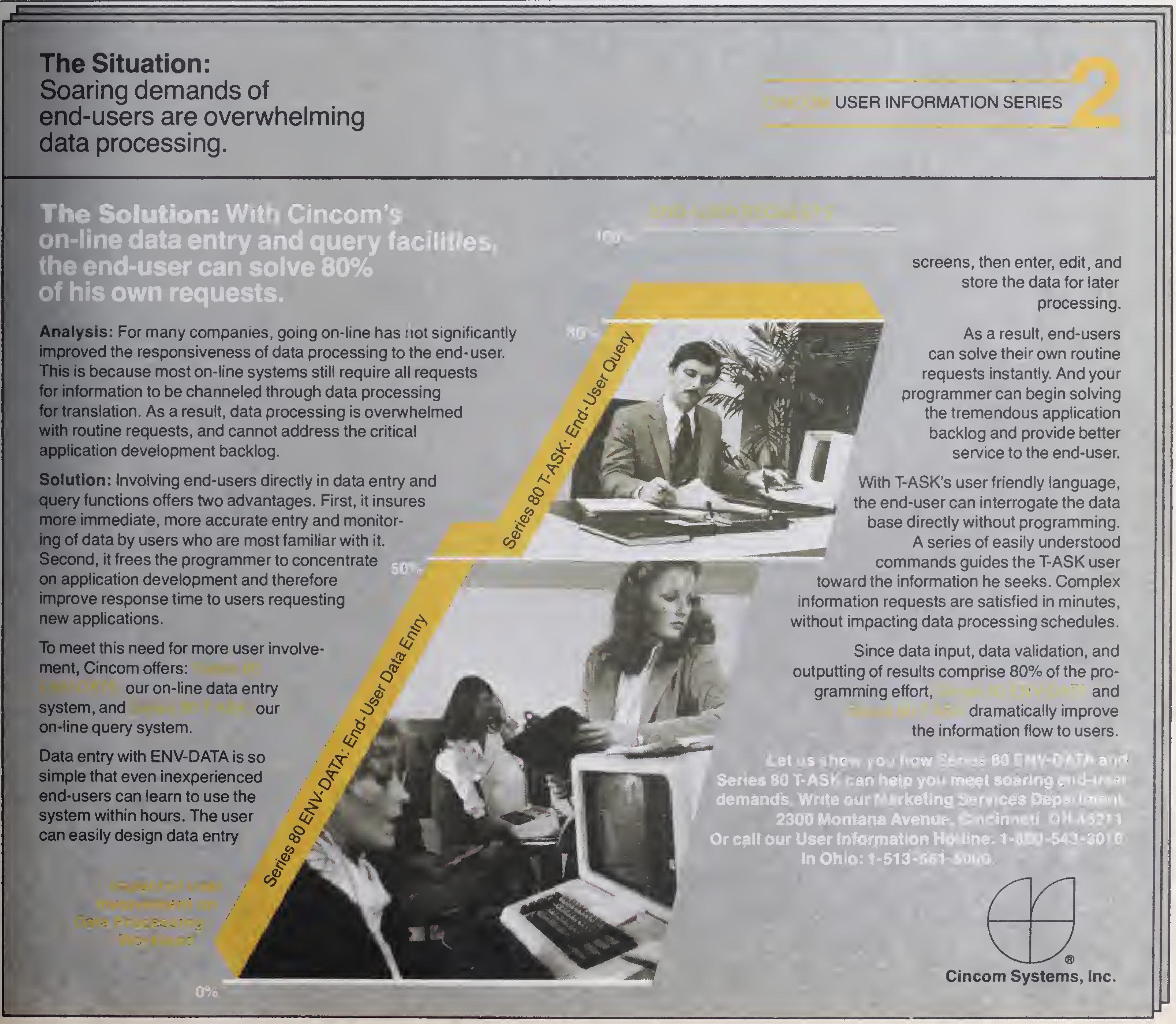
Formal classes can deal with part of the Babel of different computers and different languages. In the classroom, one can also learn the latest in methodologies to help in the enhancement or redevelopment of code. But only an extended apprenticeship with an experienced maintenance programmer can lead to an understanding of past practices and programming styles. It is this understanding rather than a criticism or value judgment about past practices that produces today's correction or enhancement.

These are some problems facing the maintainer:

- Maintaining programs written without standards.
- Lack of documentation and source.
- Different computers and languages.

We recognize that these problems are decreasing, but they are not going to disappear. Since the problems will al-

(Continued on In Depth/24)



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Solution: Involving end-users directly in data entry and query functions offers two advantages. First, it insures more immediate, more accurate entry and monitoring of data by users who are most familiar with it. Second, it frees the programmer to concentrate on application development and therefore improve response time to users requesting new applications.

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Impact of User Involvement on Data Processing Workload

(Continued from In Depth/23)

ways be there, maintenance tools are being conceived and constructed to deal with some of them.

Higher level language code can be decompiled from object files or assembler. This can be a great asset where a maintainable source file no longer exists. Structure charts and flowcharts can be constructed where no current charts exist. Cross-referencing of variables including aliases aids in the change process. There are other tools and there will be more.

The total maintenance programming environment is the major determinant in the quality and cost-effectiveness of maintenance. We have taken steps to create an environment in which "OK" maintenance programmers are highly productive in what they do well.

A great deal has been said and written about the high cost and unreliability of maintenance. As an industry, we have spent considerable effort to improve the software development process as a means of improving the maintenance situation.

However effective the improvements might be, their effect is muted if the personnel performing maintenance are not competent, motivated, productive employees. Finding such people and forming effective maintenance groups has been severely hindered by the traditional assumptions that maintenance programming is inferior, unrewarding work that must be endured only as an apprenticeship to doing something else.

Improving the maintenance situation requires the assumption that maintenance programming is as challenging and rewarding as any facet of the programming profession. It also requires an environment which deals with both the rational and emotional needs of maintenance programmers.

The rational part of the environment recognizes the unique needs of the maintenance programmer for tools, methods and training. We are convinced that resources spent on the maintenance process will have as great an impact on software cost and reliability as anything we have done for the development process. But changing technology alone will not accomplish the goal.

The organization must create a psychological environment in which it is "OK" to be a maintenance programmer. Those programmers must be recognized and rewarded for the things they do well. They must perceive that their function is as important to the organization as any other function.

So let us praise maintenance programmers. They have long been overlooked for their importance to the programming profession.

Gary M. Bronstein is director of engineering systems development at Amdahl Corp., Sunnyvale, Calif.

Robert I. Okamoto is manager of design automation at Amdahl.

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BY LARRY M. SINGER

PEOPLE

THE FORGOTTEN RESOURCE

DP managers and directors spend most of their time managing hardware and software resources in an attempt to keep the production systems running and to develop badly needed new applications. But are they concentrating enough on that third resource that allows them to make full, productive use of the other two — the people behind the hardware and software?

> *People problems don't just disappear — they get worse.*

In fairness to most DP managers, their background and training has usually included computer science, accounting or business, but "people management" as a science has been overlooked or merely glossed over. After all, in the early days, data processing was new, and the challenge came from putting up the new accounts payable or inventory control system. In the grand excitement, everyone in DP was happy and eager to do his share, even if it meant putting in 15-hour days, six days a week. Company management didn't know exactly what those programmers punched in those funny little IBM cards or which buttons the computer operators pushed to make the lights on the expensive new computer blink madly, but they didn't really care. The job eventually got done, and everyone was happy.

But times have changed, and DP has come a long way since the 1960s. The information systems director in the 1980s faces a bewildering array of choices that not only boggle any sane mind but can have a substantial — or even critical — effect on the bottom line of the profit-and-loss statement. Data base, on-line processing, communications links, software packages, program development tools — all these options and more are available and must be carefully evaluated.

At the same time, however, the information systems director faces nagging problems from the human aspect of his organization. Turnover rates have soared, and it is now common to see programmers changing jobs every two years or even more often. Training new employees is a constant, expensive battle, even when a company is lucky enough to hire them. Programmers and analysts announce to their management they can no longer maintain five- or 10-year-old application systems because of bad code and lack of documentation.

Not the Whole Answer

Simply raising salary scales is not the complete answer to personnel problems, although turnover rates may slow down until the programmers and analysts find other companies paying even higher salaries. Blaming the previous administration — although a popular tactic — is not the answer either.

Sound familiar? If so, don't feel alone. Many business and scientific DP departments face the same general set of problems, although to different degrees and in slightly different areas. But they can all be traced to a deficiency in the area of "people management." People, after all, are the means by which DP gets all that data processed correctly — or the means by which it does not.

It is time for both company and information systems management to understand that the challenges of the '80s will be met not only by the wise use of hardware and software, but by applying the basic principles of human resources and solving personnel issues instead of hoping they will go away. People problems don't just disappear — they get worse.

The idea is not to cater to programmers and analysts and let them run the company. Rather, the purpose is to (1) keep a stable, professional and experienced staff; (2) manage that staff so they are as productive as possible; and (3) help the company or organization meet its profit and growth needs.

Some lucky DP shops have only a minimal number of personnel problems and can concentrate upon the business aspect of data processing, but most installations just don't have that luxury.

The latter companies are beset by people problems that affect the productivity of the entire shop. If your section has high turnover, low morale, complaints from programmers and analysts, frequent operational problems caused by human error, bad attitudes and just plain low productivity — you most likely have a serious people problem.

It is sad that the companies with the worst people problems are usually the ones least likely to admit it.

It is a very common observation that the basic attitudes of management show up in the style of day-to-day interaction with the employees and that the attitude of senior management filters down to the middle and junior management ranks. There are exceptions, of course, but a middle manager whose philosophy and style differ significantly from his superiors' will either change his style or leave the company.

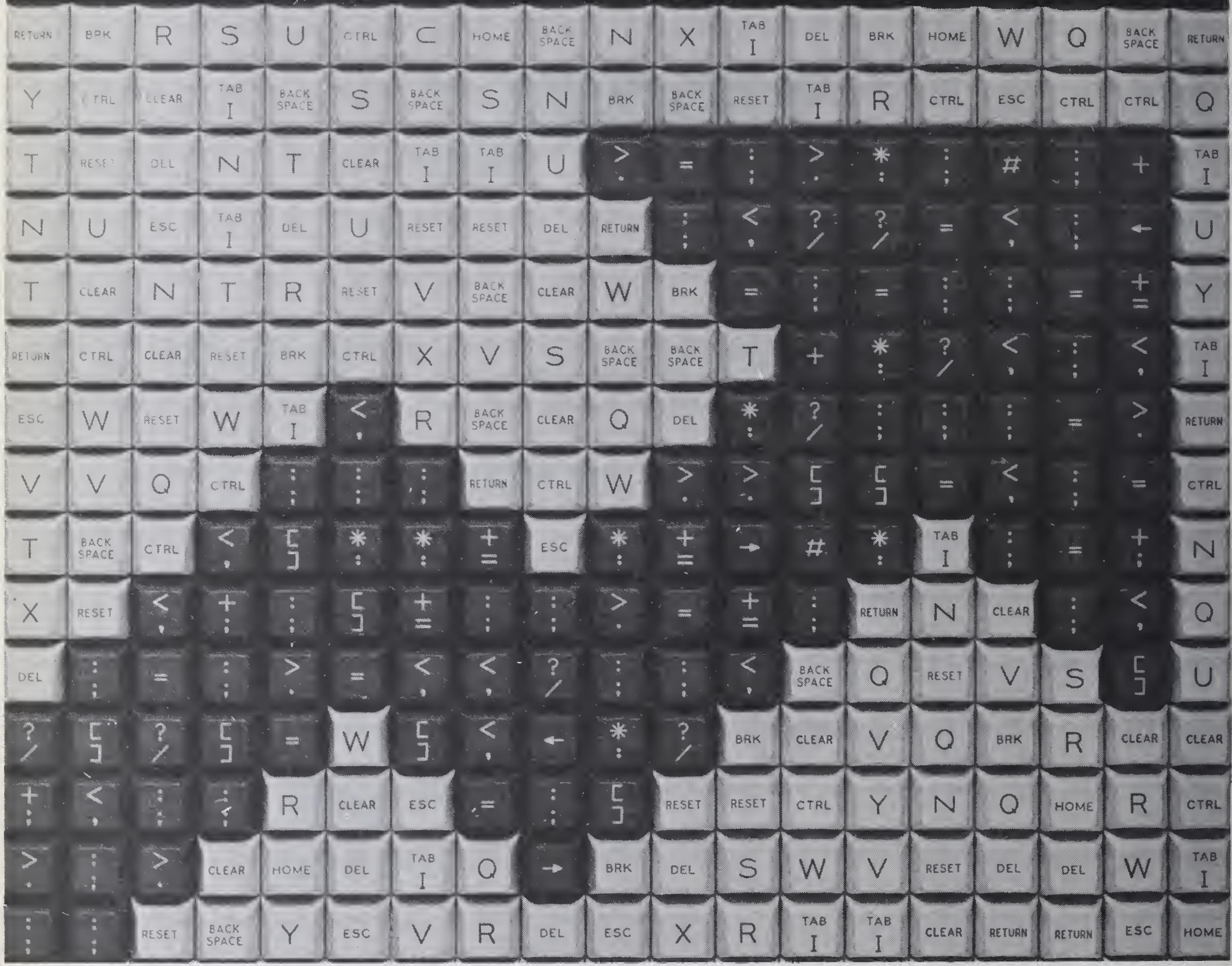
Every manager, whether he knows it or not, has his own personal philosophy of handling people. This is true for all supervisors, from the chairman of the board to the newest project leader. And every manager needs to periodically examine his attitudes, which are the direct result of that philosophy. This process is usually not very pleasant, but should be a requirement, especially in a shop that is having serious people problems.

There are at least three areas of behavior that shape a manager's actions in his day-to-day operation.

The first is his position on the "supportiveness" or "nonsupportiveness" continuum. This ranges from the manager who is extremely supportive of his staff and constantly demands salary increases, special privileges and more equipment for his people, to the opposite type who unconsciously

(Continued on In Depth/27)

KEYS TO PRODUCTIVITY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(Continued from In Depth/25)

takes an "adversary" position with his employees and questions every action, statement and opinion.

Obviously, the extremely supportive manager will fail because he must work within budgetary restraints and company policy. The "adversary" manager will also eventually fail because his people will become demotivated and leave.

These attitudes are often hard to pin down because they exist in subtle ways that permeate a person's behavior. Every manager needs to carefully define his own "supportiveness" rating and decide if he is satisfied with his position.

Helpful or Not

A second important attitude even more vital in technical disciplines concerns the "help" or "nonhelp" continuum.

At one extreme is the manager who assists his employees so much that he does virtually all the thinking and the employees become only a tool. The other extreme is a manager who is so unwilling to provide technical assistance that his employees literally flounder and waste many hours following the wrong paths.

The latter manager may feel, "There was no one around to help me, so why should I help them?" Every manager and supervisor needs to examine his feelings toward helping his staff so that ultimately they can grow professionally, but still get the work done on time.

A third attitude is the continuum of "congratulations" or "noncongratulations" behavior. Some supervisors go to extremes and praise every employee for almost every action, which makes praise almost worthless. The other type of manager may never reward or praise an employee for anything. Both extremes are damaging to productivity and morale.

The only way to position a manager on those rating scales is to have him begin a process of self-evaluation or self-analysis.

Self-analysis is always hard, and it may be more difficult for those in supervisory positions because they are accustomed to being in control of situations and not having their authority questioned. It may help to have a peer help with the analysis and discussion. That peer should be another manager who can relate to the responsibilities and problems associated with being a manager.

Sound Philosophy

The last step in self-examination is to develop a better and more productive management attitude that will help the manager solve people problems instead of only treating the symptoms. One method is to describe the way professionals usually work in a real-life job situation:

1. Professionals produce more when they are motivated than when they are demotivated. The author believes the difference is not only 10% or 20%, but can be several hundred percent!
2. Professionals need more than just a paycheck to keep them motivated — they require job satisfaction.
3. Professionals need to keep in contact with the results of their work. They need feedback from their managers and from the end users.
4. All employees require recognition from their superiors — this is true for the part-time mail boy and the executive vice-president.
5. Employees can be "pushed" to various degrees, but each person has his own level of tolerance.
6. Professionals need to be challenged. Only a few rare employees will be satisfied when they exhaust the challenge of their jobs.
7. Employees need to have — or at least perceive that they have — some control over their activities and priorities.
8. In most situations, professionals and other employees become more productive when treated in a positive manner. Although certain people do produce more when they are treated negatively, those employees are generally more of a liability than an asset.

A manager should carefully consider each of these eight behavioral observations and determine if he agrees or disagrees. Perhaps his own training will influence his opinions, or possibly his company has rigid and inflexible policies that preclude a manager from developing his own style of management. Whatever the reason, a manager or supervisor who seriously disagrees with the preceding eight points should consider his performance on the job. If his organization does indeed have serious people problems, he may want to consider the possibility that his personal attitudes may be a contributing cause.

Develop Action Plan

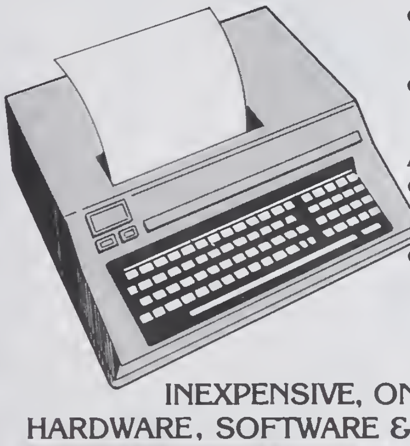
The three elements in solving personnel problems are action, planning and teamwork. Like any major systems project, solving a major people problem requires a detailed list of specific steps and a cost analysis for each activity. Some recommendations or solutions may be nice, but must be forgotten because they are not cost effective. Interestingly, the majority of solutions to people problems cost surprisingly little or even nothing!

Those steps that do require direct expenditure (or even an indirect one, such as hours on company time) can be justified if management understands that motivated people produce far more than demotivated ones.

The plan must be implemented through action and not just by talking or promises. The total management staff must become involved in the implementation and the measurement of success or failure. One supervisor has little chance to implement a satisfactory program that will raise morale and keep it high.

Another key to the program is the efforts of the first-line managers who supervise and direct the professional

(Continued on In Depth/30)



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(Continued from In Depth/27)

staff. They will set the tone for the day-to-day improvements that must take place to solve a serious people problem.

Improve Communications

The first step in any action plan is to open the lines of communication up and down the management chain, and laterally, and then keep them open. Some specific techniques are:

- Make sure each employee has at least one formal conference with his immediate supervisor once each week. In a busy DP department, an employee may frequently interact with his supervisor, but only on specific, individual problems and questions. Professionals need to have "stand-alone time" with their supervisor away from the phones and constant interruptions.
- Print a monthly status report showing where the department has been, where it is now and where it plans to be during the next reporting period. Employees need to have some understanding of where the department is and how their efforts fit into the overall plan. Even a one-paragraph summary is a step in the right direction.
- Establish lateral lines of communication between DP and other groups in the organization. Too often, DP professionals tend to congregate in their own private world of bits, bytes and reruns; they lose track of the company as a whole. Frequent guest speakers can solve that communication gap very quickly. These briefings should also include computer operators and data entry personnel, who usually feel even more restricted.

List Problems, Solutions

While the lines of communication are being opened, the DP first- and second-level managers can begin holding individual meetings with the professional staff to discuss problems and potential solutions.

It is important to remember that most employees see problems as they affect them personally, not as part of a large "syndrome of problems" that may affect the entire department. It is management's job to analyze those individual problems and generalize them to explain the behavior of the whole group.

Employees react in different ways when asked the obviously loaded question, "What do you see as the problems here?' Some will hesitate to answer for fear of offending the inquiring manager, while others will relish this chance to unload a barrage of real and imagined complaints. Most professionals, however, will fall somewhere in between. They will measure each response with a hesitancy that comes from a touchy interpersonal relationship. As the lines of communication are opened, the professional staff will be able to handle these sessions with more assurance and better responses.

One method of ensuring cooperation is to hold a general meeting to carefully explain the purpose of the individual sessions. Perhaps the sessions should be held in small groups of three or four, such as an individual project team, to help the staff feel at ease and yet give them the moral support of their peers.

Every intelligent employee realizes that not every problem or perceived problem can be solved by management action. Data processing itself can be a very frustrating occupation and programmers and analysts soon learn to handle those normal, day-to-day problems or eventually change occupations.

But there are some types of problems that go beyond the normal job frustrations and can cause severe morale problems and high turnover. The interviewer's job is to separate the two types of problems.

Once the problem and the solutions have been proposed, the next step is to attack the problems one at a time if the solution is judged to be cost effective. The effort to solve problems should be a continuing priority and reevaluated at least every month. As the problems are solved, it is fair for management to publicize in a low-key manner the fact that the problem has been recognized and solved. There is nothing wrong with management doing a little public relations work for itself as long as it is done quietly and effectively.

Besides the specific problems reported by the professional staff, management should examine some com-

mon problem areas that affect far too many DP installations. The next sections discuss some of the more common organizational problems.

Matching People, Positions

Are people dissatisfied because their job responsibilities are too much for them or are they quite frankly bored because their job has no intellectual challenge?

The first case can be handled by education or training, even if it is only a specific hour a day to read IBM manuals or study documentation. The hour a day lost to this training will be more than repaid with increased productivity.

The second situation is somewhat more common and is usually caused by a lack of para-professional support personnel to handle production support, clerical and operational duties that programmers have no interest in doing. Para-professionals should be intelligent trainees who can progress through a well-defined career path and can handle DP responsibilities. They will usually become programmer trainees if they show the desire.

Chain of Command

A rigid, highly structured internal organization may be an underlying cause of discontent. The matrix type of organization is a new alternative, but most DP departments still use the traditional chain-of-command structure even though this may lead to problems. If people are assigned particular roles in a department or division and have contact only with their immediate supervisor, they may become frustrated. Such employees feel limited because they have very restricted contact with other staff or with management.

A chain of command is a valid organizational system, but the structure should be used with moderation. The second- or third-level manager should occasionally attend meetings of programmer groups or go directly to an analyst for some specific item of information. It is not always necessary to ask a supervisor to ask a programmer — the manager can ask himself.

A programmer should be allowed to sit in on some meetings with management or user groups if the subject is of particular interest to him. For example, a programmer who is in charge of production support for the payroll system should have contact with the payroll department when significant changes are being proposed.

A department or section brown-bag lunch once a month will give employees a chance to meet with a DP director and discuss issues in a neutral and friendly atmosphere.

Mythical Career Path

As any supervisor who has interviewed prospective employees knows, one of the first questions from a candidate is, "What is the career path for me in your company?" Most interviewers stumble along with some fabricated excuse that tries to hide the fact that the department has no career path. Others pull out an organizational chart and proudly point to themselves and imply that it is "normal" to receive promotions to management ranks.

A career path that points to a management role is misleading, since the most common way to gain a management promotion is to be at the right place at the right time after someone has quit or been fired. This situation does not happen very often, and it is a poor personnel practice to suggest that management positions are the "career path."

A more realistic plan is to show professionals a career path based upon title and job responsibility changes. The path should be defined so that a programmer or analyst can see a promotion at least every two years — and sooner for the best performers. If a programming staff has not had significant title changes in the past two years (other than caused by turnover), that department obviously does not have a career path.

It is not easy to discover and attack the problems that cause job dissatisfaction, high turnover and low productivity. However, by applying sound principles of management and with a strong commitment, a DP management group can slowly but surely turn things around.

Larry M. Singer is an independent consultant in Columbus, Ohio.

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Developing Your Distributed Data Base

BY GERARD L. POWER

Complex problems appear in building a distributed data base system. These problems are so difficult to solve that no computer vendor or software house has yet offered a completely generalized data base package.

As distributed processing systems continue to emerge from their infancy, information systems such as distributed data bases become a desirable implementation possibility from the end user's perspective. Any distributed network consisting of a series of computers and their peripheral devices connected by some data communications facility is capable of supporting some form of a distributed data base. This article will briefly introduce the many issues and some of the possibilities involved in developing such a distributed data base.

Distributed data bases provide several potential advantages over a centralized data base. Since the data is allowed to be placed at its point of need or point of highest utilization, the distributed system could potentially reduce the overall communications costs and improve query response time, especially in a geographically dispersed organization. A distributed data base may be built on a series of smaller computers rather than on a single massive machine, thus reducing the total hardware and software cost through economies of specialization. In addition, distributed data bases are more reliable than a centralized data base since they are not as susceptible to total data base failure. Should the computer at one site fail because of hardware or communications faults, the other computers may remain up and functioning.

A distributed data base system can grow with the data base. When a centralized data base begins to push the processing capacity of the machine, the entire system must be upgraded significantly (often requiring a new machine); but in a distributed data base system, one can easily add a new processing node where and when it is needed.

The Essentials

From the end user's point of view, a distributed data base offers essentially the same facilities as a centralized data base. The system should have the following characteristics:

1) It should transparently make allowances for the differences in the hardware and software architectures between the distributed nodes (that is, the differences in the representation of data, peripheral access methods and system implementation idiosyncrasies).

2) It should aid in data distribution to allow migration from the existing centralized system as well as within the distributed system to ease data base growth and data tuning operations (moving segments of the data base through the distributed network in order to improve overall data base performance).

3) It should include facilities for individual distributed data base node start-up and recovery.

From the implementation viewpoint, however, several complex problems appear in the process of building a distributed data base system. These problems tend to be so difficult to solve that none of the computer vendors or software houses has yet offered a completely generalized distributed data base package. Concurrency control, the part of the data base system that allows concurrent processing of multiple transactions on the data base, is one of these problems. The problem of ensuring that the data base remains consistent is an integrity problem. In many cases, a single solution to both the concurrency and integrity control issues can be derived.

The data base schema describes the data and its location within the data base. In a distributed data base environment, this requires the use of some type of systemwide data base directory. Since the directory is in itself an information data base, it too is subject to many distributed processing difficulties.

Other problems involved with distributed data bases include security, administration and recovery. This article deals with several basic solutions to many of these problems.

Data Divisions

The data may be divided among a distributed data base system's nodes in several ways. In a fully redundant data base system, each data base site contains a complete copy of the entire data base. A partitioned data base, on the other hand, allows each site to have a section of the data base without any replication of the data between the sites. Partially redundant data bases are those that fall between these two extremes.

No matter how the data is physically divided, the user interface to the system must make the physical data location transparent to the user. This allows users to request the processing of a transaction independent of the data's location.

Most of the present attempts to provide a commercially available distributed data base package are either built around systems that are logically centralized (that is, very dependent in some manner on a single, centrally located controlling node) or else extremely limited in functional capabilities. In dealing with purely distributed data base implementation issues, the worst case system would obviously be that of the partially redundant data base system. Since it also provides the most user flexibility, it is the type of distributed data base system with which this article shall deal unless otherwise stated.

Transmission Philosophies

In transmitting queries between the distributed nodes there are two basic transmission philosophies, broadcast transmissions and daisy chaining. Broadcast transmissions require that the node creating the query be responsible for sending all required transmissions through the network. Daisy-chaining transmissions only require that the node creating the query send a minimal number of messages which are passed through the network by the receiving nodes as the query is accepted for processing.

The broadcast method allows all requests to be resolved within a minimal span of time at the expense of adding many messages (that is, overhead) to the system. By daisy chaining, the number of messages transmitted will be minimized; however, the time required to complete the transmission cycle can be greatly increased.

In addition, the daisy chain transmission discipline forces an implied ordering on the nodes. Any node failure would disrupt this ordering, and so a complicated recovery scheme is required in order to keep the network operational when faced with the possibility of a site's failure.

Any solution to the concurrency control problem should work for the entire data base (both internally, within a single node's section of the data base,

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and externally, between copies of the data base residing at the remote sites) with a minimal amount of overhead involved in transmitting the control information between the various nodes in the system. The simplest method for obtaining concurrency control in a distributed data base system would be the logical extension of the locking mechanism used in a centralized system (logically providing only single user update access to a small subset of the entire data base).

In this solution, a single node is specified as being the central coordinating control unit that manages all the system locks maintained throughout the data base network. A node wishing to do an update must first transmit a message to the control unit informing it of the node's intentions. The control unit then transmits the required lock requests to the necessary nodes and returns a signal to the requesting node upon completion of the lock operation. The requesting node finally transmits the update requests to the remote nodes and then requests that the control unit unlock the remote nodes.

In comparison with the completely centralized data base approach, the performance of a centralized control unit update action would be much worse because of the communications time delays involved between nodes.

Distributing the control mechanism among the sites could greatly improve overall performance. In this instance, a node intending to do an update would first transmit lock requests to all the affected nodes within the network. Each of these nodes must then return a "lock granted" message to the originating node. Should any node reject the lock request, the originating node would have to release all its acquired locks and reapply for each of the locks in order to avoid a possible deadlock. Upon obtaining all the required locks, the source node must transmit the actual update instruction to the other nodes, wait for acknowledgment from each node and then release each of the locks.

The overhead involved in this type of scheme is quite substantial because of the sheer number of transmissions required, the time required to transmit each message and the time to process the message at each node. For the end user, this would directly translate to an unacceptably slow system response time.

This approach may be improved by combining the lock request and the update message into a single transmission unit and by combining the update commitment and the lock release messages into a single message unit. This scheme requires only three transmissions per involved node (an update request, an acknowledgment from the receiving node and an update commitment), while the previous method requires five transmissions per node. Although this improved method reduces the overhead of the straightforward locking protocol used by the centralized control unit, it still requires a substantial amount of time and communications resources.

Dealing With Deadlock

Whenever locks are used, there exists the possibility of deadlock, which must be detected and corrected. In a centralized system, a state graph consisting of all presently pending requests can be created and used to detect a deadlock. In a distributed data base, this is still a workable solution; however, because the overhead involved in maintaining a global state graph is very high, it is necessary although perhaps undesirable.

In building a global state graph, a user's transaction can create several local transactions for each of the remote sites where a file action is required. Each of the local transaction processes and file resources form the state graph nodes, and their lock requests and grants form the state graph arcs. Should a cycle form between a set of local transactions, then a local deadlock has formed. If, on the other hand, a cycle forms between remote transactions, then a global deadlock has formed.

Once a deadlock has been detected, recovery procedures must be initiated to preempt one of the deadlocked transactions. A special section of the recovery procedure must check to see if the deadlock has been caused by a process that has obtained a group of resources and not been able to release them because of some network disrup-

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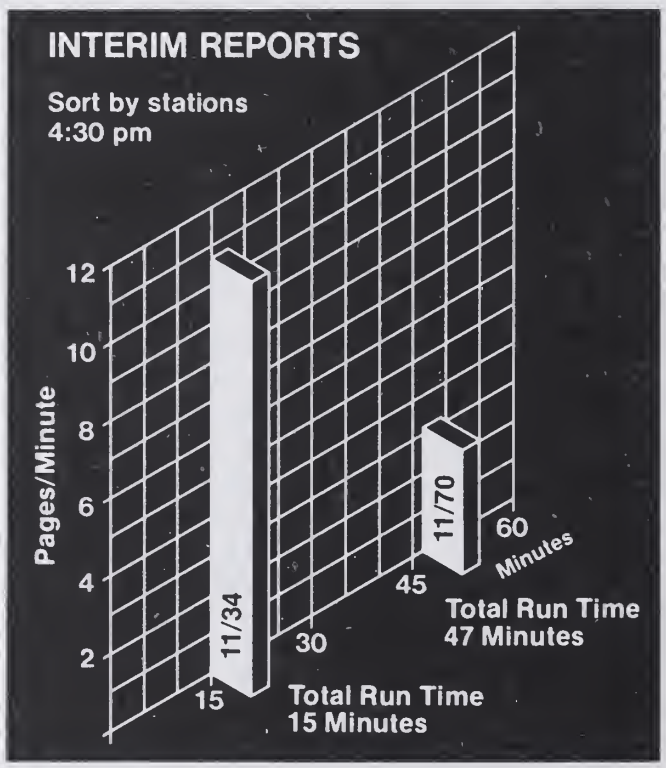

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tion. Favorable results have been obtained using a distributed locking mechanism and a global state graph in hierarchical distributed systems, where each system only maintains a state graph for all locking requests made to it from its subordinate nodes.

Another approach to the concurrency control problem is the primary copy concurrency algorithm. As with the centralized locking mechanism, this method requires the specification of a central coordinating control unit within the network. All update requests are forwarded to this master node, where concurrency control is maintained by local locks. The requests are sequenced as they execute in this central control unit, and they are then transmitted, along with their sequence numbers, to the remote sites. Since all nodes process the same transactions in the same order, consistency between the remote sites is maintained.

The major disadvantage to this concept lies in its dependency on the central node. The performance of the entire system is limited by the performance of the central node, since all update requests must flow through it and, should the node go down, the entire system would grind to a halt.

Logical Clocks

Many concurrency control methods make use of several logical clocks, one at every host within the system. After initiation, each logical clock notifies all other nodes in the system when it advances its clock by one tick, and it only advances its clock after receiving notification that all the other nodes have advanced their clocks.

The logical clocks work much like a set of counters and therefore function independently of the data base processing load and machine characteristics. Given that all transmissions are handled in the same manner, it is apparent that in a stable system, at any time any two nodes' logical clocks will differ, at most, by one clock tick. Messages going from one host to another will require no more than two logical clock ticks to be delivered.

The methods that make use of such logical clocks should work well within systems specifically designed around the logical clock's tick since the increment notices could be designed directly into the communications protocol. The communications requirements of this system in a generalized network architecture (such as Systems Network Architecture), where each clock increment notice would form a distinct message, could prove to be extremely costly in terms of total overhead, and therefore special consideration should be paid to the exact implementation details if such a system is being considered for implementation.

The simplest of the synchronized logical clock concurrency control methods transmits the logical clock time, or time stamp, along with each update request to the required remote nodes. At the remote nodes, all requests are held until the request's time stamp and the actual logical clock's time differ by two ticks, ensuring that should any further requests arrive, their time stamps will be greater than the time stamps of the processes presently being executed. The incoming request areas are then compared with the presently executing and pending requests bearing an earlier time stamp and, should any concurrency conflict arise, the request will be rejected. The request is then compared with the other requests bearing the same time stamp and, should any concurrency conflict be found, all but one request must be rejected.

All nonrejected requests will be processed after four logical clock ticks in order to allow rejection notices sufficient time to arrive from the other remote nodes. Since each site will process the same series of requests at the same logical time, the concurrency constraints will be met by this system.

Global concurrency control systems such as the logical clock method may be used in conjunction with a local lock manager (as used with most centralized data base systems) residing at each remote node. This lock manager behaves much as a centralized lock manager would. Alternatively, each node may maintain a time stamp with each data base record (or attribute value) reflecting the time the last update was issued.

An update request must then carry with it the time stamp of the record on which the update request is based. Should this time stamp differ from the time stamp associated with the record, indicating that an intermediate process has altered the record, the request will be rejected at processing time.

There are, of course, several variations to these concurrency control methods. One popular method, known as the majority consensus algorithm, allows each remote site to vote on the acceptability of each update request. In one implementation, the data base is queried and a set of values along with their creation time stamps are returned, allowing the process to generate and submit a request to the system. Only if the majority of the nodes vote to accept the request will it be committed; otherwise, it will be rejected.

The voting may be done by either broadcast method (sent to all nodes and tallied at the requesting site) or daisy-chain method (sent to one node which adds its vote to the tally and then passes the vote on to the next node in line), depending on whether time or line overhead is being optimized.

To vote, a node will compare a request's time stamp with that presently in the data base and reject the request if their time stamps do not compare. Nonrejected requests are then compared with the presently pending requests; if there is a conflict, the node will abstain from voting, or if there is no conflict, it will vote to accept the request. If the majority of the nodes vote to accept the request, the request will

(Continued on In Depth/36)

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be accepted; otherwise, the request will be rejected. In all cases, all the other nodes are notified of the outcome of the voting process. A node which abstains from voting has detected an unresolved conflict which will be resolved when the node receives all the involved vote results.

The proof of correctness for the majority consensus algorithm is relatively complex, but it does show that it provides for internal as well as external concurrency control and is entirely deadlock-free. It is a reliable method in that, even if a few of the nodes should go down, the method is not directly affected. Its only possible drawback is in the amount of communications overhead required.

Other Methods

Other types of distributed concurrency control methods include the use of several physical rather than logical time clocks. These methods lead to another problem in initially synchronizing the clocks and in preventing any substantial drift from developing between them. To account for these factors, it is usually best to periodically pass a time-check message throughout the system; nodes that find themselves behind the time check can increment their local physical clock, and the nodes that find themselves ahead of the time check can slow down or suspend the clock.

It is important to realize that if a node were to directly set its clock back, it would become possible to generate a query with an earlier physical time stamp than a query previously transmitted over the network. By altering this idea so as to make use of a single global clock, one can eliminate the synchronization problem, but it introduces further problems with its dependency on that controlling clock. In addition, if the differences in the distances between the nodes and the clock are large, variable transmission times could cause queries to be processed out of sequence.

It is also possible to use a series of control units in order to generate a set of sequence numbers. In order to submit a request, a node must first obtain a logical ticket from one of these controllers. This sequencing ticket is then passed along with the update request to keep the ordering of the transaction processing equivalent between remote sites (much like the idea of a logical clock). Another possible solution is to make use of a single logical ticket which is passed among the active nodes in the system. Only while a node possesses this ticket may it request that a transaction be processed. It is an extremely simple solution, as the degree of concurrent processing is directly controlled by the system (indeed, it is almost a nonconcurrent method). This means that performance is severely limited by the system and this will normally be a major concern.

Integrity Recovery

Integrity control as applied to the related fields of the records can usually be handled by expanding the concurrency control solution. The major integrity control complication with distributed data bases involves the failure of a node and its recovery attempts. When a remote node does fail, the other nodes in the system should continue to function correctly. Finally, when that failed node is brought back into the system, it must be made current and consistent with the other operating nodes. All transactions that can go through completion with the data that is available within the system should do so; those requiring unavailable data may have to reject that transaction until the data becomes available.

Clearly, any system that is to remain operational when faced with the possibility of node failure will duplicate the entire data base at least once through the distributed data base system so that should any node fail, the entire data base will remain on-line.

Reliability problems are directly affected by the concurrency control philosophy adopted by the system. For example, given the situation where an update transmission consists of an update request and an update commitment, the communications line to a remote node could fail after granting the transaction permission to update, but before receiving the commitment signal. This would result in allowing the originating node to commit the transaction in all nodes except the excluded

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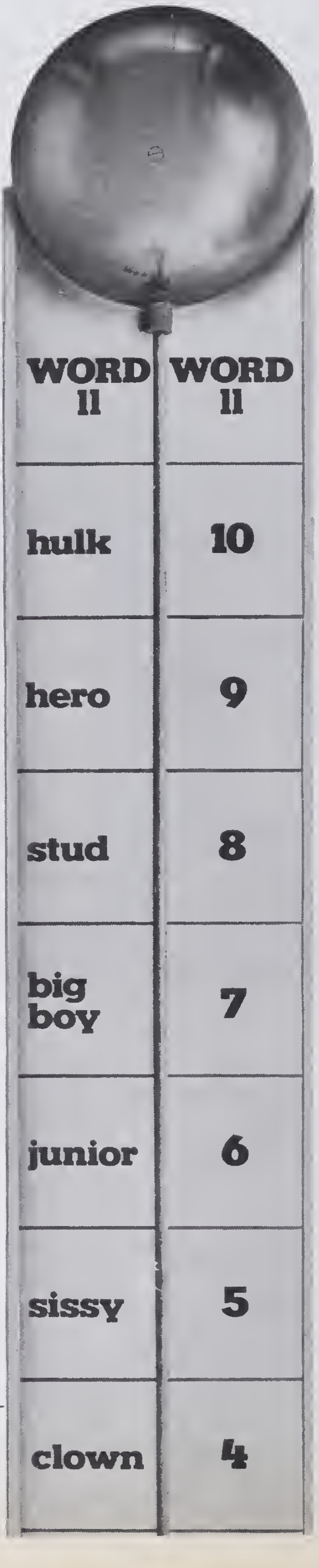

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node. To avoid these types of occurrences, a well-connected physical network is required so that any single line or node failure cannot totally separate the distributed nodes into disjoint systems.

Line, Node Failures

In a distributed computing environment, you must consider the possibility of individual node and line failures. When a communications line fails, the queries must be routed around that line, possibly to an entirely different node within the network. Should the entire node fail, transactions could be either rejected entirely or queued in a neighboring node until that site is made available again.

When the failed node is brought back into the system, it must be brought up to date by resolving the transactions that have proceeded in its absence. If the transactions were queued, they can be applied to the data base or, alternatively, nodes containing the failed node's data may be queried for update information. If a locking mechanism is applied to the data base, care must be taken to ensure that the locks as well as the data are recovered and updated.

Should network failures divide the entire system into sections, severe problems can occur. Since each section of the system should continue to operate at a best-effort level, each half may be processing a different, conflicting set of transactions, totally unaware of the other sections' actions. There is no easy solution to this problem, since both halves of the system have accepted and committed to a perfectly valid set of transactions.

The most reasonable solution would be to back up all sections of the data base to the most recently saved consistent state and begin processing again from the audit trail on the complete system. The majority consensus algorithm, as discussed earlier, does not have this drawback. Since update actions are only performed if the majority of the nodes accept the request, all update requests will be rejected unless most of the nodes can communicate their vote.

Security Considerations

When one considers a distributed network, the first impression in regard to security is that the network is far less secure than the centralized system because it is so vulnerable at the communications line level. To a certain degree, this is true; however, one must keep in mind that in most packet networks the messages to be transmitted are first broken into packets and then dynamically routed through a complex network of many physical lines. This means it would take a significant amount of effort for a person to monitor a line, obtain enough packets and remove their control information to decipher the actual message.

If this natural level of transmission security is deemed insufficient, there are many encryption packages available today. They can be made available to the user to encrypt the raw messages themselves or they can be placed on the communications line itself to encrypt the entire transmitted packet.

Conceptually, distributed data bases are themselves somewhat more secure than a centralized data base. As the data base could be distributed according to the security needs of that section of the data base, access to the section could be easily controlled by structuring the nodes' access requirements around the protected data. In addition, since there are many sections of the data base that must be attacked to beat the security of the overall system, it becomes a much harder task to gain access to the whole data base in a distributed system than in a centralized system.

Data Base Administration

Not much attention has been paid to the data base administrator in previously published material on distributed data bases. In a centralized system, the administrator is directly responsible for the entire data base. It can be a difficult task to try to provide the services that he alone provides in a centralized data base. A single administrator in a distributed system would be unable to meet the system's needs as, in most cases, he could not provide the total support required of a large, diverse distributed system. A large set of site data base managers would also probably prove to be insufficient because of the lack of any single coor-

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dinating control.

It is possible that the most flexible and manageable organization would be to combine the responsibilities of the data base and network node managers into a single function and then provide these site managers with network and data base system administrators.

In the past, most managements have handled the problem of organizing the administration of a distributed data base in a hit-or-miss fashion. Although more work is being done in this area and can provide overall organizational guidelines, too few studies have been done on the effects of the migration to a distributed processing system on an organization's data processing management to allow any real conclusions to be drawn.

Distributed Directories

The data base system directory contained within the schema is essentially a small data base in its own right. It is primarily used by the distributed data base management system to aid in doing system-level transaction message routing. Most of the design issues involved in accessing the distributed data base can be directly applied to the data base directory. There may be a master-level directory maintained at a control node with optional subdirectories residing at the remote nodes themselves. These subdirectories can be maintained dynamically according to some queuing philosophy or statically, containing information concerning queries often placed by that node. A fully distributed directory in which each node maintains an independent and complete systemwide directory is another possibility. Alternatively there may be a local-level directory where each node maintains a directory for the information located only at that node.

The master-level system places a high level of dependency on the central control unit. The system must have the ability to remain stable even when faced with the loss of that control unit, a very demanding requirement.

The fully distributed directory places much overhead on the system's resources because of its size and redundant nature; however, it does provide very good performance on queries placed to remote nodes.

The local-level directory saves on system resources; but, on the other hand, it performs very poorly on data queries placed to the remotely residing nodes.

Probably the best implementation involves combining the local-level and the fully distributed directory so that each node contains a full schema/-directory for the locally residing data and some form of linked list pointing to the nodes containing the desired nonlocal data.

The selection of one of the above methods to solve any particular problem in designing the distributed data base system should be based on the details of the system on which it is to be run. Different recommendations could be made depending on the physical characteristics of the network and the data base itself, the assumptions made concerning the types of queries, the rate at which they will be placed and where they will be directed. At present, there is much interest in the area of distributed data bases, and until the problems and trade-offs involved are completely understood and satisfactorily solved, a completely generalized distributed data base system will remain unimplementable.

Most of the work done in the past has been aimed at building specialized distributed data base systems. Hopefully, in the future, research efforts will be directed more toward making use of existing networks.

This article has described many of the problem areas that must be considered when designing a generalized distributed data base system. Several possible solutions to some of these problems have been briefly outlined to illustrate the current thinking on these matters. It cannot be emphasized enough that care should be taken and all feasible solutions considered or your dream data base system could turn into an expensive nightmare.

Gerard L. Power is a member of the research staff at the Codex Corp., Mansfield, Mass.

This article is the result of work recently completed by the author while a computer science research assistant at Pennsylvania State University.

Power holds B.S. and M.S. degrees in computer science from Penn State.

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IBM Slapped For Abuses In Business Overseas

ARMONK, N.Y. — IBM recently received from the European Common Market commission a "statement of objections" to several of the business policies it follows in Common Market countries.

The objections were raised in a report recently released by the commission, culminating an investigation started in 1974.

IBM said the objectionable practices included the disclosure of certain technical information to competitors on a timely basis, issues related to software and the inclusion of some computer memory in the pricing of some CPUs.

'Interface Case'

Although an IBM spokesman declined to provide further specifics of the inquiry report, he said the allegations were similar to claims already litigated in IBM's favor in the U.S. such as the Memorex Corp. "interface case."

IBM will file its written answer to the objections and appear before the commission most likely during the first half of 1981. The spokesman noted IBM has cooperated fully with the inquiry process since 1974.

Although a ruling by the Common Market could restrict IBM's trade practices in those countries, any ruling by that body is subject to appeal to a court in Luxembourg for a final decision.

Rose Ann Giordano

DEC Revamps High-End Arm

MAYNARD, Mass. — Digital Equipment Corp. has realigned its large-end computer business, bringing the marketing, long-range planning and centralized support services under a newly organized Large Computer Product Group (LCG).

The LCG will now have total operational responsibility for DEC's 36-bit Decsystem-10 and Decsystem-20 computer families, according to Andrew C. Knowles, vice-president of the Technical Group. In recent years, marketing of the LCG systems was managed by various product groups throughout the company.

Knowles announced the appointment of Rose Ann Giordano as LCG product group manager. Giordano formerly served as marketing manager for the Technical Group.

Giordano joined DEC after working nine years for Xerox Corp., where she was New England district manager for computers and electronic printing systems within Xerox's Business Systems Division.

(Continued on Page 64)

CCIA Hits GSA Reading Of Price Cuts Clause

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Industry representatives here have raised alarms about allegedly imprecise and overly broad interpretations of federal DP contract provisions that, it is feared, might lead to government charges of vendor overbilling.

The subject of the concern is the so-called Price Reductions clause standard to many General Services Administration (GSA) contracts for federal DP equipment. Generally stated, the clause provides that vendors will offer federal purchasers discounts equal to those offered to commercial customers.

Disputed interpretations of the clause led to GSA charges in October that Digital Equipment Corp. and Tektronix, Inc. had overcharged the government $1.2 million and $1.3 million, respectively, by not passing on discounts they had offered private-sector customers [CW, Oct. 20].

At the time, GSA said it was looking into the possibility of bringing criminal charges against the two companies for contract violations.

The charges against DEC and the possibility of similar actions against other companies prompted a letter of protest to GSA from the Computer & Communications Industry Association (CCIA) last month.

"Our central concern is that the Price Reductions clause is so ambiguous that it is virtually impossible to understand or apply," wrote CCIA President Jack Biddle to David Walden, of the GSA's Automated Data and Telecommunications Service (ADTS).

"While we do not condone contractor abuses, the Price Reductions clause is so poorly drafted that it should not be used as the basis for substantial civil or criminal liabilities," Biddle told Walden, ADTS deputy commissioner for program management.

'Broad Interpretation'

Biddle noted "recent reports" that "GSA has adopted an extremely broad interpretation" of the clause and "is seeking to enforce that interpretation against numerous contractors."

In light of this alleged GSA policy, the CCIA president suggested the clause be redrafted "to state its purpose more accurately." He suggested a version resembling the "unique version of the clause" he said IBM has been allowed to incorporate into its federal contracts.

The IBM version "is far more precise" than the standard clause wording, according to Biddle, in limiting the price reductions definition to those instances in which GSA "can legitimately demand a reduction." This version "should become standard boilerplate in future schedule solicitations," he said.

"There is no basis for allowing one vendor not to give GSA price reductions which other vendors must incorporate in their schedules," Biddle said.

After detailing what CCIA sees

(Continued on Page 64)

Comdisco Thriving In Used Equipment Market

By Marcia Blumenthal
CW Staff

ROSEMONT, Ill. — Dealing in used computer equipment is akin to speculating in the commodities market. Subject to quick shifts in supply and demand, the business is volatile and exciting.

Comdisco, Inc., the largest remarketer of IBM equipment, is thriving in this environment, with revenues of $265 million last year. Now entering its second decade of operation, Comdisco has become IBM's fourth-largest user, according to Kenneth N. Pontikes; the firm's chairman and president.

Formerly a high-powered IBM salesman, Pontikes saw fertile opportunities in 1970 when IBM users began upgrading to 370s. Starting out as a broker for other lessors, Pontikes was soon overwhelmed with business and started selling equipment rather than brokering it. Comdisco now sells and leases new and used IBM and Amdahl Corp. equipment.

Driving the company is Pontikes' philosophy of "making a reasonable profit and taking reasonable business risks." Balance your risks and develop a discipline for saying no to deals, advised Pontikes.

The third-party market is a deal-making one, and there is a lot of quick money to be made, but when changes come "they come in storms, and if you are positioned wrong you're out of business."

As Pontikes sees it, Comdisco will lose money on 10% of its deals, break even on 15% and make a profit on 75% of its transactions. "If you don't have losses or break-evens, you are not being aggressive enough," he reasoned.

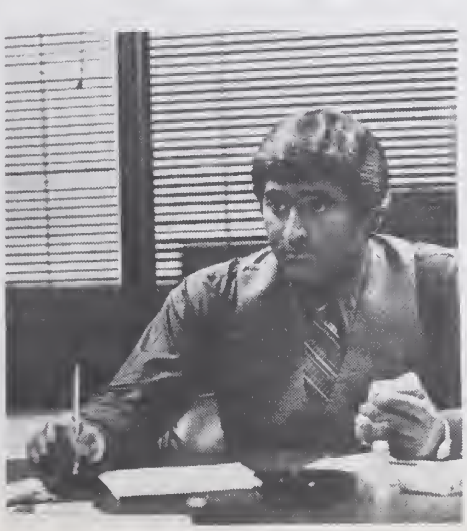
Although Pontikes believes in making deals on a handshake and cultivating long-term relationships with customers, Comdisco has developed an intricate data base for tracking the quick-paced used computer market.

"We hire and train our sales personnel to track 10,000 IBM installations in the U.S. and Canada," explained Nicholas M. DiBari, senior vice-president of marketing.

Comdisco has a profile of every company with an IBM 138 or larger system. The data base includes information such as what equipment the user has on order and when it will be delivered. "This gives us a barometer of supply and demand for equipment," DiBari noted.

(Continued on Page 62)

Kenneth N. Pontikes



Nicholas M. DiBari

Comdisco Thriving in Used Equipment Market

(Continued from Page 61)

DiBari, who joined the company in 1975 from Storage Technology Corp., started Comdisco's program of selling and leasing peripheral equipment. The company also deals in Amdahl equipment, which accounts for about 5% of revenues.

As the largest remarketer of IBM equipment, Comdisco tries to keep between $50 million and $100 million of inventory on hand so that customers can get immediate delivery when they need systems. During 1980, Comdisco placed 150 computers per month at user sites.

However, like other vendors and lessors, Comdisco in 1980 experienced only a moderate expansion in revenues and reduced earnings compared to the prior year's performance. For its latest fiscal year, Comdisco's revenues were $265 million, up 18% from 1979 revenues of $225.2 million. Between 1978 and 1979, revenues grew by 47%.

Earnings last year dropped to $7.1 million from $10.6 million in 1979. By comparison, earnings growth between 1978 and 1979 was 216%.

Users were putting off purchase decisions awaiting IBM's announcement of its H series. With IBM's introduction of the 3081 in November, business should be brisk this year, particularly for IBM Series 30 equipment, DiBari reported.

"As long as interest rates don't cause Comdisco's rates to go above IBM's rental, we are OK," DiBari said. However, during 1980, Comdisco reportedly was not always able to provide highly attractive lease rates.

Besides a pickup in business due to the announcement of the 3081, Comdisco has about one-third of its equipment coming off lease in the next two years, which will afford significant cash flow and earnings.

> *'Users were putting off purchase decisions awaiting IBM's announcement of its H series. With IBM's introduction of the 3081 in November, business should be brisk this year, particularly for IBM Series 30 equipment.'*

Although publicly held, the firm does not expect to go to the equity market for financing. Comdisco went public in 1971, raising $400,000 in equity capital and raised another $10 million last summer, Pontikes said. The firm is closely held, with about 60% of the shares held by employees.

Along with its regular business of selling and leasing computer equipment, the company operates a subsidiary, Comdisco Financial Services, Inc., which offers users leveraged lease financing for new equipment. Last year that subsidiary had completed more than $1 billion worth of equipment financing. This unit of the company is one of the fastest growing, last year accounting for $23.4 million in sales, up from $4.3 million in 1979.

Last year the company started a Disaster Recovery Service. The idea developed from the requirement of public accounting firms that companies have backup for their data.

The service was feasible for Comdisco because its equipment coming off lease generally has little book value and is generally fully paid out, allowing the company to offer 370 backup at very competitive rates. One disaster recovery center, with two large 370 mainframes, is now operating in Chicago, and eight others are planned at various locations in the U.S.

Another service Comdisco offers is moving users DP sites. Comdisco will buy all of a user's old equipment and sell and install all the new equipment for the new data center. This service is offered through Comdisco Technical Services, a subsidiary of the company.

Although Comdisco does lease other capital equipment besides computers and peripherals, Pontikes is cautious about straying too far from computers. It is hard to get the return on other equipment that Comdisco gets on computers, Pontikes noted. "We are pros in our business and neophytes in a lot of other areas."

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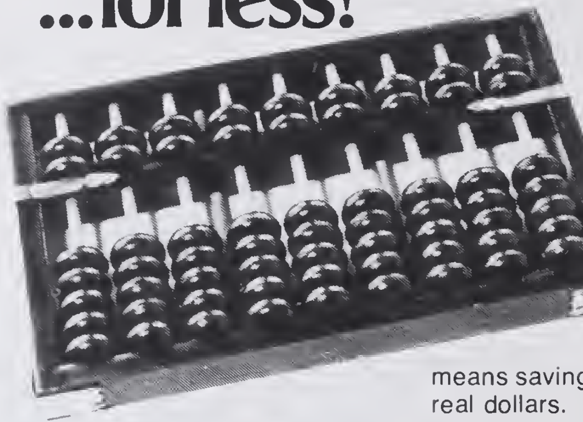

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Poor Performance Cited

NTSC Causes Parent to Lose Reported $6.55 Per Share

TORONTO – Continued poor performance by its U.S. subsidiary, Northern Telecom Systems Corp. (NTSC), has caused the parent company, Northern Telecom Ltd., to announce it expects to report a loss for 1980 with earnings reduced by $6.55 per share.

This loss consists of a write-off of goodwill and technology investment of $107 million and a $113 million charge for a write-down of inventory and other provisions, such as an allowance for uncollected receivables and the closure of certain plants.

In commenting on the company's problems, Northern Telecom President and Chief Executive Officer Walter F. Light said, "When we acquired Sycor and Data 100, our intent was to be a leader in the markets resulting from the convergence of data processing and telecommunications technologies."

Difficult Consolidation

During the past year, Northern Telecom had reported difficulties with consolidating its Data 100 and Sycor acquisitions into NTSC [CW, July 21]. One reason for this was reportedly high turnover among management from the two acquired companies.

In addition, NTSC discontinued selling operating leases to third parties. Virtually no sales of leases were made in the second quarter and none were made in the third or fourth quarters. Limited third-party lease sales may be made in the future as dictated by business conditions, Light said.

Employee Cutbacks

During 1980 NTSC's employment roster was reduced by about 1,700 employees. An additional 600 people will be terminated in early 1981, the firm said.

"The forthcoming reduction will consist of about 300 people in NTSC's international operations and a similar number in the U.S. manufacturing, engineering, marketing and administration functions," Light said.

Northern Telecom closed manufacturing facilities in Ann Arbor, Mich. and Goldsboro, N.C., in 1980. This required moving production lines of several of NTSC's most competitive and successful products to other plants, resulting in reduced manufacturing productivity and problems in shipping new systems.

Overall, Northern Telecom's actions are viewed as short-term sacrifices to ensure the continued growth and profitability of the firm.

Light noted that "the development of new electronic office systems products is proceeding well and we will announce a number of new products and enhanced feature capabilities for our existing systems in 1981."

Federal Court Dismisses Citibank Countersuit

NEW YORK – A federal district court here has dismissed a counterclaim brought by Citibank alleging that the Association of Data Processing Service Organizations, Inc., (Adapso) conspired to delay the bank's entry into the data processing services industry.

Citibank's counter suit had also charged that Adapso's complaint was a "sham suit" in violation of the Sherman Antitrust Act.

The counterclaim was made as a reaction to Adapso's suit charging that Citibank, by offering certain data processing services, is in violation of the National Bank Act.

In rendering the dismissal of the countersuit last month, Judge Kevin T. Duffy said Citibank's argument was not sufficient to sustain its counterclaim and noted that Adapso's suit was a legitimate attempt to settle a specific area of law.

The entire case has been placed on the suspense calendar until the Federal Reserve Board completes its finding in a related rule making proceeding involving Citicorp and Adapso.

This future proceeding will attempt to determine the types of DP services bank holding companies may provide under the Bank Holding Company Act [CW, Oct. 20].

IBM Restructures Stock Plan, To Seek Capital in Debt Market

ARMONK, N.Y. – IBM has announced that stock for its employee stock purchase plan will come from authorized but unissued shares, starting this month.

IBM will discontinue its current practice of purchasing open market stock for the employee plan.

This change will raise about $500 million additional capital per year to help finance the growth of the company's production facilities as well as the increased number of machines leased by customers.

IBM sells shares to its employees at 15% below market prices, according to an IBM spokesman.

In addition to capital from the employee stock purchase plan, IBM said it expects to borrow funds in the debt market in 1981.

Under the employee stock purchase plan, approximately 7.5 million shares were sold to IBM employees during 1980.

The company currently has about 584 million shares outstanding.

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Deltak Charges ASI With Copyright Infringement

OAK BROOK, Ill. — Deltak, Inc. has filed a suit in the U.S. District Court against Advanced Systems, Inc. (ASI) for copyright infringement.

The recent complaint charged that during 1980 ASI published and distributed an untitled publication approximately 50% of which was allegedly copied from Deltak's copyrighted "Career Development System."

Deltak is seeking compensatory damages plus $3 million in punitive damages and all profits ASI has derived from the use of the copyrighted material.

The latest suit is the third round in a battle between the two competitors, both of whom provide multimedia training programs primarily for personnel in the DP industry.

October Suit

In October Deltak filed suit against ASI and one of Deltak's former employees to prohibit use of confidential information Deltak charged ASI obtained by hiring the former employee.

Subsequent to that action ASI countersued Deltak on that action and further instituted a claim for defamation against Deltak and its president, Robert King.

Trade Balance for Computers Sets Record $5 Billion in '80

WASHINGTON, D.C. — During the first nine months of 1980, the U.S. positive balance of trade for computers and business equipment was $4.24 billion. This ensures a new record trade balance of more than $5 billion for the industry in 1980, according to the Computer and Business Equipment Manufacturers Association (Cbema).

Of total exports for the industry of $6.4 billion, computers and related equipment and parts comprised $5.4 billion or nearly 85% of exports, Cbema reported.

Total imports of computers and office equipment totaled $2.2 billion, of which computer imports comprised $815 million or about 37%, the association noted.

Cbema President Vico E. Henriques said that in the first nine months of 1980, the industry surpassed 1979's positive trade balance of $4 billion by a substantial margin. He added that the final figure for 1980 may reach $6 billion.

CCIA Protests GSA Reading

(Continued from Page 61)

as inconsistencies and problems in GSA interpretation of the standard clause, Biddle complained that GSA auditors are enforcing it more strictly than its wording or purpose would seem to dictate.

"GSA should either state its intention clearly or stop demanding reductions which the contract does not allow it to receive," he said.

The CCIA letter included a proposed "model clause" based on the IBM version. "The specific provisions which we advocate should be acceptable to GSA because they are based on the Price Reductions clause which has been included in IBM's schedule contract," Biddle said, adding "there is no reason why IBM's Price Reductions clause should be different from any other contractor's."

DEC Revamps LCG Arm

(Continued from Page 61)

"Restructuring our LCG organization follows our strategy to reinforce and grow our high-end time-sharing business," Knowles said.

The group is reportedly the seventh within the Technical Group to become a profit and loss center.

To date, DEC has shipped 1,000 Decsystems since the product was introduced in 1971, a DEC spokesman explained.

Although the realignment provides for total operational responsibility for Decsystem products, the company has not decided whether the unit will have a dedicated sales force for the products.

Guide Lists Electronic Mail Execs

NORWALK, Conn. — The two-volume, 1,100-page *Electronic Mail Executives Directory* is available from International Resource Development, Inc.

The directory identifies executives from within the top U.S. companies who are responsible for office automation, telecommunications, word processing, data communications and in-plant printing supplies and procurement.

It costs $95, the publisher said from 30 High St., Norwalk, Conn. 06851.

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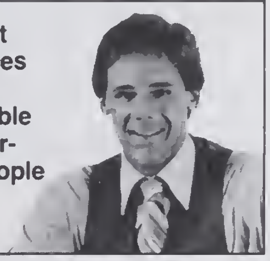

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Mergers Strengthen Docutel, Datasaab in U.S.

Mergers/ Acquisitions

Docutel Corp. and Datasaab AB have entered into merger or acquisition activities in order to strengthen their positions in the U.S. market for financial transaction systems.

Docutel recently signed agreements with the Olivetti Group of Ivrea, Italy, whereby Docutel will purchase a majority of the assets of Olivetti's financial systems business in the U.S.

Docutel will purchase those assets for 295,000 newly issued common shares and also sell Olivetti an additional 125,000 newly issued common shares for $2.5 million in cash.

These shares are unregistered and will be sold to Olivetti for $20/share, roughly 12% below market-value when the terms of the arrangement between the companies were made, a Docutel spokesman said.

B.J. Meredith, chairman and chief executive officer of Docutel, noted that through the proposed agreement his firm will gain a complementary line of new terminal systems sales organization and an infusion of capital.

In addition, plans are under way to have Olivetti market Docutel's automated teller machines in specified international markets.

In Sweden, Datasaab announced its proposed merger with L.M. Ericsson, a Swedish computer and telecommunications firm. Terms of the merger were not made public.

The transaction is expected to strengthen Datasaab's U.S. position for financial transaction systems. These systems are marketed and assembled in the U.S. by Datasaab Systems, Inc. (DSI) of New York, a subsidiary of Datasaab.

Revenue Climb

This subsidiary began marketing its products in the U.S. in 1974 and has increased revenues an average of 50% a year, reaching more than $30 million recently, DSI reported.

DSI expects most of its future growth to be in applications dependent on telecommunications, a specialty of L.M. Ericsson.

These types of systems are increasingly in demand for networks with terminals at branch offices of banks and for 24-hour automated teller services, according to John Magliana, president of DSI.

Other Moves

General Electric Information Services Co. and Lambda Technology, Inc. are negotiating an agreement for the acquisition of Lambda Technology.

Storage Technology Corp. recently consummated the acquisition of **Documation, Inc.,** manufacturer of printers and related products.

M/A-COM, Inc. has entered into an agreement whereby it will acquire **Microwave Power Devices, Inc.** subject to the approval of Microwave's stockholders.

Informatics, MAC Form Joint Venture

LOS ANGELES — Informatics, Inc. and Management Analysis Co.(MAC), a subsidiary of Bayside Holding Corp., have formed a joint venture company, Infodynamics, Inc., to provide computer-based information management systems and support services to the power industry.

Infodynamics will offer computer systems for use in the design, construction, operation and maintenance of power generating plants and large-scale synthetic fuels projects, the two partners noted.

This will include complete prepackaged and custom-designed software, system development and on-site implementation services, network service center processing support and turnkey hardware and software systems design, a spokesman noted.

Lewis H. Vovakis, vice-president of Informatics Information Services Group, has been named president and chief executive officer of the new company.

Robert C. Traylor and David J. Ashley, formerly with MAC, will serve as executive vice-president and director of marketing, respectively.

Memorex Assembles European Operation For OEM Equipment

SANTA CLARA, Calif. — Memorex Corp. has assembled a new European organization dedicated to the distribution of OEM equipment and media.

Heading the operation is Alex A. Bieber, OEM director for Europe, whose office is at Memorex International headquarters in London.

Bieber maintains five regional sales offices for Germany, France, UK, Scandinavia and a single office covering Belgium, the Netherlands, Luxembourg, Switzerland and Italy, Memorex noted.

Bieber joined Memorex in October from Control Data Corp.'s offices in Lausanne, Switzerland, where he was regional manager for OEM sales.

Applications Packages: A direct route to successful systems.

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Applications software is the most exciting and dynamic branch of the independent packaged software field. According to International Data Corporation, by 1984, applications software will account for 55% of the entire independent packaged software market. This means revenues will have nearly tripled and the opportunities for future growth are unlimited. Packaged software, because of its tremendous flexibility and diversity, is gaining rapid acceptance from users and they are demanding newer and more sophisticated solutions to their DP problems.

Our January 26th Special Report, *Applications Packages* will tell you the many ways users are putting these software packages to work for them. Edited by Rita Shoor, *Applications Packages* will take a look at the increasing technological (and financial) feasibility of these new packages, and why they've become so attractive to users. Featuring tutorials and articles from consultants who specialize in software selection, you'll read about:

- Software evaluation—choosing the right package for the right system.
- Cutting the costs of software maintenance.
- Interfacing the application package with the data base management system.
- The technology behind portable packages.

If you're an MIS Executive, DP Manager, Project Leader or Lead Programmer, you'll want to read our January 26th Special Report. And if you market programming products or services, you'll want your ad in this issue.

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As DDP, Office Products Converge

McCracken Heralds New Type of Business User

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — The distributed data processing (DDP) and office products markets are rapidly converging, and their eventual union will herald the emergence of a vast new class of business systems users, according to Ed McCracken, general manager of Hewlett-Packard Co.'s Computer Groups.

The merger of distributed processing and office products sectors will probably take place in about five years and will yield a huge market that HP terms the "distributed decision support" field, McCracken said.

In the past, computing power has been concentrated in the hands of the technological elite and a few other privileged minorities, but today the composition as well as the scope of the user population is rapidly changing.

Management Function

"Distributed processing is evolving from a strictly DP function to a management function, and at the same time, office systems are changing from an exclusively secretarial resource to a professional's resource," McCracken said during a recent interview. "In short, both DP and office systems are rapidly entering the main flow of corporate operations."

The movement of distributed processing and office systems into the mainstream of business decision-making has only just begun, McCracken said.

Eventually, the two converging information systems disciplines are expected to find their way into the hands of previously noncomputer-oriented professionals like engineers, materials planners, financial analysts and corporate executives, the HP official predicted.

Together, these professional users will form a vast new market, most of which still remains virtually untapped, McCracken said. In the end, many classes of business professionals are expected to be equipped with their own personal workstations through which they will be able to routinely gain access to centralized data bases and computing resources.

Operating atop their users' desks, the workstations will reportedly enable professionals to do myriad applications, including computation, financial analysis, text processing, and standard office functions like calendar management.

McCracken partly attributed the expected convergence of the distributed processing and office products fields to recent dramatic advances in computing technology. "The same technological forces that allowed the industry to geographically distribute $100,000 to $200,000 systems during the 1970s is now allowing us to distribute less than $100,000 systems in 'campus' environments during the 1980s," McCracken explained.

The eventual union of the distributed processing and office-products markets recently took another small step toward reality, McCracken continued, when HP last month introduced its 45 page/min Model 2680 laser printer. Geared primarily to operate as part of a distributed processing network, the 2680 reportedly produces letter-quality print and allows business professionals to tailor hard-copy output to their individual reporting requirements.

This ability to customize a management report's design and format is expected to be prerequisite to a successful assault on the "distributed decision support" market. "As information processing moves from the traditional computing room to the line-operational part of the business world, nontechnical managers will become increasingly unwilling to read reports printed in the usual DP style," McCracken explained.

Expansions

Compuscan, Inc. has made plans to move its headquarters from Detroit to 9950 W. Lawrence Ave. No. 52 Schiller Park, Chicago, Ill. 60176.

Columbia Data Products, Inc. has moved its operations to a 34,000 sq-ft facility at 8990 Rt. 108, Columbia, Md. 21043.

The Raytheon Service Co. has opened an office at 305 Fellowship Road, Mount Laurel, N.J. 08054, to provide computer software development services to government and commercial clients.

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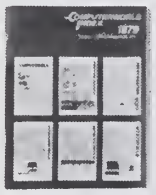

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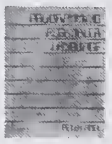
SC126
Computers and Social Controversy
Thomas Logsdon

This book examines the social consequences which the use of computers will eventually bring with it. Seven major areas are covered, including computers and privacy, crime, education, artificial intelligence, automation, consumerism and banking. **$17.95**

HP233
Programming Real-Time Computer Systems
James Martin

This volume explains real-time systems from the points of view of management, systems analysis, programming, and sales. The book discusses design, programming, testing, and implementation of real-time systems. In defining "real time," Martin goes beyond a mere discussion of a real-time computer's essential characteristic (i.e., direct and immediate response to rapidly changing situations). Program testing and system build-up, which are particularly difficult on real-time systems, are discussed in detail. **$21.95**



HP232
Programming Assembler Language
Peter Abel

This book is a concise, detailed analysis of ASSEMBLER, the efficient language that provides an alternative to languages like COBOL or PL/1. Each chapter covers a separate area of ASSEMBLER and includes sample programs, end-of-chapter exercises, and debugging tips to help newcomers to ASSEMBLER develop effective programming strategy. **$16.95**

BP223
Computer Optimization Techniques
William Conley

This book takes a greatly simplified approach to optimization problems and thus lets the computer produce the solution with ease. Computers have become so fast and computer time so inexpensive that it is now possible to state an optimization problem—whether linear or nonlinear—as a highly accurate reflection of reality, then let the computer search all the possible solutions and produce the optimum regardless of the functional form of the problem. This book demonstrates that a nearly optimal solution will be produced for practical problems that necessitate a random search. **$25.00**

WJ129
Fundamentals of Data Communications
Jerry Fitzgerald and Tom Eason

An introductory book for people with little previous knowledge of data comm. Includes discussion of hardware, design methods, network configuration and control concepts. **$20.95**

CS121
The Basic Handbook
Dr. David A. Lien, author of the TRS-80 Learner's Manual

The publishers say that this book is an "encyclopedia of the BASIC language," that will help you "make those programs found in magazines work on your computer—or know the reason why they can't." If there is an alternate way to write a needed function that your machine doesn't have, this book will give you a subroutine to accomplish the same thing. If there is another way to write a program with different BASIC words, the book will show you how. **$14.95**

BP131
Problem Solving: A Systems Approach
Robertshaw, Mecca and Rerick

Shows how to zero in on problems, strip them down to key issues and then resolve them, using general systems principles. Uses many examples from various fields, including data processing, to involve you in real-world problem confrontations and the use of systems tools for their solution. **$19.25**

BP134
Data Processing Training Handbook
Gary Slaughter

This book addresses the reasons for justifying DP training, how to justify it, and how to measure its effectiveness. It also assesses the readiness of your DP department to move ahead with a cost-effective training program by providing you with a means of analyzing the current status of your DP operation as compared to other formal DP training programs. **$15.00**

WJ141
Communications and Data Management
T. Walton

"How to establish an ideal information systems plan for your organization." This information planning handbook helps you implement an overall, long-range data management plan insuring adequate information at low costs and giving you improved performance, improved user enthusiasm and improved cost-efficiency. **$33.50**

BP133
Electronic Communications Systems
William C. House, Editor

A comprehensive group of articles on the new and exciting communication systems available through electronic means. Subjects covered include: Basic Communication Concepts, Network Fundamentals and Emerging Satellite and Packet Networks, Current Trends in Data and Word Processing, Expansion of Intelligent Terminal Networks, Key Telecommunications Applications. **$25.00**

PM124
Research Directions in Software Technology
Edited by Peter Wegner

Consisting of contributions from some of the most prominent researchers in computer science today, this book assesses the past, present and future impact of computer research on the development of software technology. Emphasizes the relation between theory and practice and the reliability of increasingly complex software projects. **$29.95**

WJ139
Microcomputers
Wise, Chen and Yokely.

Find out how microcomputers may change and their future impact on society in this "technology forecast and assessment to the Year 2000." Includes microprocessors, memory, peripherals and software. **$15.95**

IC130
Application Design Handbook for Distributed Systems
Robert Patrick

An excellent handbook for the practicing systems analyst, this book is a state-of-the-art approach to the mechanics of computer application design and an organized compendium of application design hints. It's a non-mathematical treatment based on firm data processing principles, and provides basic coverage of human factors, performance, distributed data and systems availability concepts that must be considered during the evolution of a successful design. Addresses economics of distributed computing and includes a checklist of 95 activities to be considered by the designer of a distributed system. **$22.50**

BE125
Modern Project Management
Claude W. Burrill and Leon W. Ellsworth

A comprehensive book about data processing application development, presenting a project methodology designed to assist all levels of management in their efforts to achieve productivity, quality and worker satisfaction. **$39.00**

WJ12B
An Introduction to Programming and Problem Solving with Pascal
Schneider, Weingart and Perlman.

This book will help you gain a firm working knowledge of the entire PASCAL language. It also teaches the fundamentals of programming in general, and an awareness of the importance of programming style. **16.95**

HP216
Successful Data Processing System Analysis
Thomas Gildersleeve

Here's a convenient one-stop reference helping you through every major area where smooth-operating management and consulting is essential. Included in this volume are cost benefit analysis, development of functional specifications, creative thinking, data collection, communication, and much more. You'll see how to determine how well the functions in your system are presently being performed. Plus, you'll get scores of real-life models, practical guidelines, checklists and on-target pointers. **$18.95**

WJ143
Advanced ANS COBOL with Structured Programming
Gary Brown

This book does not deal with the elements of programming, but goes right to its task: teaching the basics of COBOL and simplifying many of COBOL's advanced features, including sort/merge, character string manipulation, report writer, indexed and direct files, communications facility and others. Emphasis is placed on structured programming as a way to simplified programming. **$24.95**

BP132
Personnel Management
Sang Lee and Cary Thorp, editors

A guide to the use of computers in personnel management. Includes a description of the nature of Personnel Information Systems, the role of time-sharing and consulting services, legal problems and more. **$17.50**

CS122
Learning Level II
Dr. David A. Lien

This book covers Level II BASIC on the TRS-80, including a special section on converting Level I programs to Level II. It does not require a knowledge of Level I, however. It explores every important BASIC capability in detail, with the emphasis on learning how to use it, including the Editor, dual cassette operation, the real-time clock, printers and other peripherals. **$15.95**

HP212
Computer Systems Performance Evaluations
Domenico Ferrari

Covers every major computer systems measurement technique for a more assured, practical approach to all your evaluations! Improve your expertise in measurement, simulation, analytic modeling, selection, improvement, design, and numerous other essential methodologies. Dozens of illustrations, tables and charts guide you to better results. **$31.95**

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Executive Corner

- Louis W. Haire has been appointed president of Solid State Technology, Inc.
- Peter R. Genereaux has been named president and chief executive officer of DTSS, Inc. by the board of directors.
- Dr. Lawrence Roberts has been elected president of GTE CNS Products, a newly established component with GTE Communication Network Systems, and J. David Hann will succeed Dr. Roberts as president of GTE Telenet.
- James E. Burke, chairman and chief executive officer at Johnson & Johnson, has been elected to the board of directors of IBM.
- Prime Computer, Inc. announced the appointment of eight new vice-presidents: David Cheesman, research and development, UK; Edward Christiansen, software development; Byron Gaymon, research and advanced systems; Peter Gyenes, European sales operations; Donald Jacobs, human resources; John Ludden, marketing services; Dennis Ohayn, distributor sales; and James Walsh, general counsel.
- Ralph Gabai has joined Dataproducts Corp. as senior vice-president of marketing and corporate development.
- Walter C. Waltrip has been named vice-president of engineering, and Joseph S. Ksepka has become director of quality assurance at the Peripheral/-OEM Division of Telex Computer Products, Inc.
- Robert Schultz has been appointed vice-president of product marketing at ADP Network Services, Inc.
- Richard B. Songer has been named division vice-president of field operations in the service division of Pertec Computer Corp.
- Philip Harding has been selected vice-president of engineering for the Remex Division of Ex-Cell-O Corp. and Don Wilson has been promoted to vice-president of operations at that firm.
- Richard J. Spangler has been appointed vice-president of European operations at International Computer Programs, Inc.
- Robert J. Shea has joined Paradyne Corp. as vice-president of international marketing.
- A. Allen Gural has assumed the position of senior vice-president and partner at Electronic Banking, Inc.
- Richard J. Olsovsky has been named to the newly created position of midwestern region vice-president of sales at Printer Systems Corp.

New Companies

RKR Computer Associates, Inc. is a consulting group that provides technical and management consulting services to the DP industry and acts as a broker service for the medical and dental professions on behalf of physicians or dentists. They are located at 26 Valley Greens Drive, N. Woodmere, N.Y. 11581.

Logic Technology Services, Inc. has been established to provide memory device programming and part marking to the electronic manufacturing community, including Prom, Eprom and PAL. They are at 2400 E. Oakton, Arlington Heights, Ill. 60005.

Technical Services and Consulting, Inc., at 10 Stuyvesant Ave., Lyndhurst, N.J. was recently developed to provide specialized training programs in IMS and CICS systems.

Data Processing Recruiting Specialists was recently formed to locate computer marketing personnel. They are headquartered at 5865 Hampton Ave., St. Louis, Mo.

Supershorts

The Charles River Partnership III has invested $750,000 in Scientific Systems Services, Inc. (SSS), and Dr. Patrick Liles of the Charles River Partnership has been named a director of SSS.

— — —

Evans & Sutherland Computer Corp. has made a substantial investment in an integrated circuit manufacturing firm called VLSI Technology, Inc.

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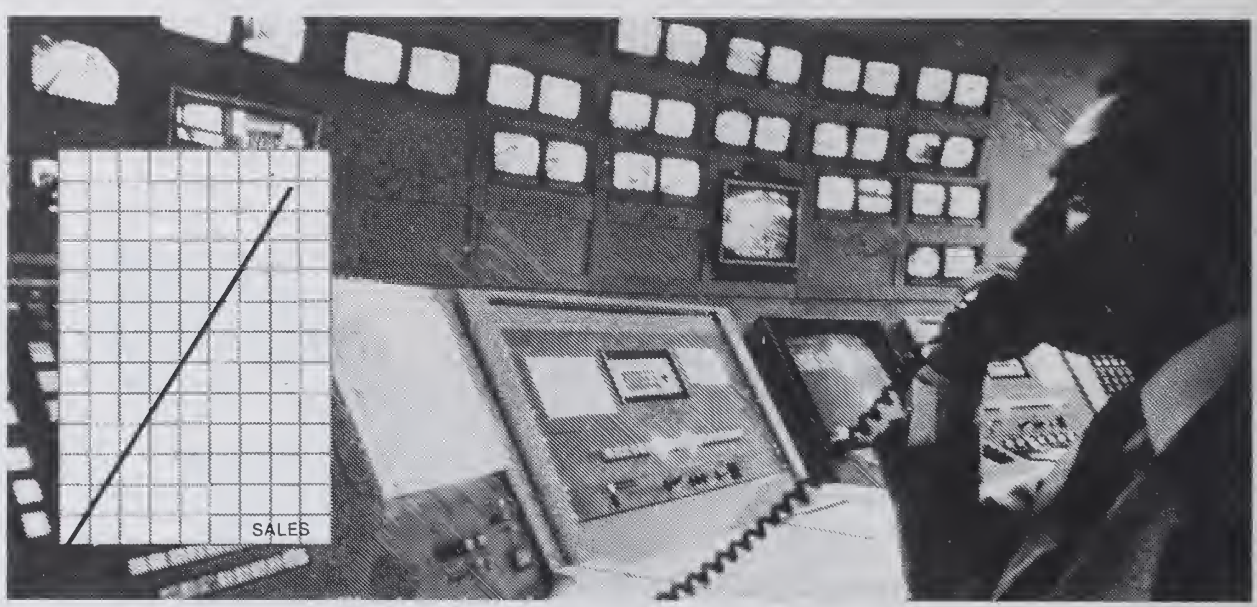

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Software Engineer (Systems Analyst)

BSEE or BSCE, cable systems or business programmer experience and knowledge of a high level language necessary. CATV experience preferred.

Software Engineers

BSCS or equivalent degree; experience in process control system or real time software; knowledge of BAL plus a high level language necessary. Knowledge of Pascal and mini and/or high level micro-computers a plus.

Software Engineer

BSEE or equivalent. Exposure to BAL and a high level language, along with mini and/or high level micro-computers, necessary. Some real time knowledge, a plus.

Digital Design Engineer

BSEE; experience designing digital circuitry and digital hardware; and designing with microprocessor-based systems (M-6800 preferred), necessary. Data communications experience, a plus.

RF/Digital Design Engineer

BSEE or 10 years experience - RF and digital (in lieu of degree); circuitry design/development experience necessary.

RF Amplifier Design Engineers

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Test Methods Engineers (Taiwan)

BSEE with experience with automatic test equipment and minicomputer applications used for incoming inspection and in-line testing of products containing both analog and digital circuitry.

Electronics Development Engineer (Taiwan)

BSEE with minimum of 3 years experience in digital circuit design. RF experience helpful.

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Challenging opportunity to help move Data General into the large commercial (end-user) marketplace. Bachelor's degree required plus three or more years experience in the computer industry in systems, sales, product planning or product management.

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Responsible for market/product strategy and execution for all communications equipment and terminal products. Experience in communications technologies, hardware or software required. Technical degree required. MBA a plus.

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Responsibilities will include development and implementation of marketing strategies, new product evaluation, market penetration studies and pricing. Strong emphasis will be on product management, marketing support and marketing research. Candidates should have a strong technical background (technical degree preferred) with 8-10 years proven product management experience, preferably within the small business systems environment.

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Sales Support Professionals are required in all of the following areas:

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Coordinate and help direct the efforts of our North American Sales force; at the same time develop and implement the necessary plans for selling Data General business and technical computer systems to large accounts within specific industries. Candidates should have 5-8 years sales/marketing experience within a specific industry, a fundamental understanding of business equipment/data processing operations as they pertain to that industry is essential.

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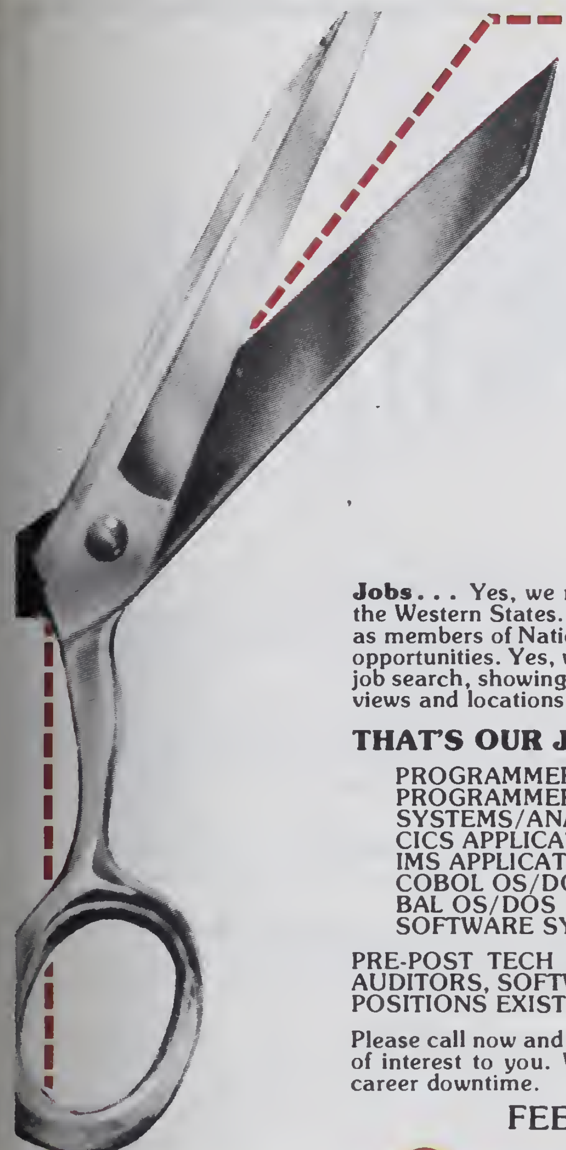

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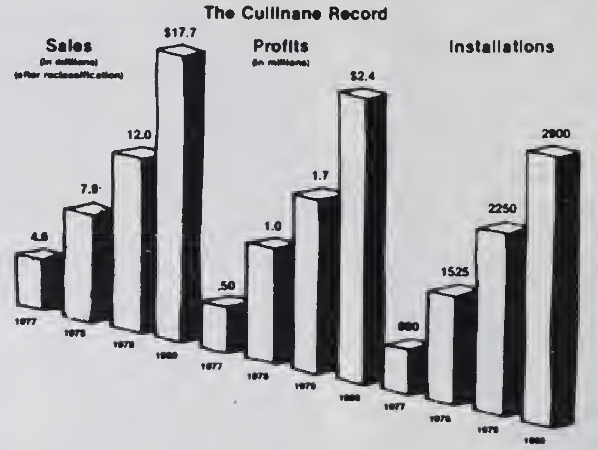

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Mgrs. IBM System 3/34/38

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CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

DP PROFESSIONALS PROGRAMMERS/SYSTEMS ANALYSTS

The Management Systems organization of TRW's Defense and Space Systems Group has immediate opportunities for DP professionals seeking answers to today's information systems problems. TRW-MS is in a growth mode affording potential promotional opportunities to the right individuals. If you have 2 years of experience in any of the following areas, we would like to talk with you:

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Hardware: IBM 370-158, 3032, 4300, 8100, CDC Cyber Series, Prime 550, DATAPOINT, HP 1000 & 3000, and DEC Series 8, 10 & 11's
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Bldg. E1/Room 4029/DEPT. CW-1/81
One Space Park, Redondo Beach, CA 90278

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Salaries of computer professionals have risen this year by as much as 20%. Is yours keeping pace? How does your current salary compare with those of other professionals at your level of responsibility and experience? Is your income growth keeping up with inflation? Are you making as much money as you should be—or *could* be? Is your career heading in the right direction?

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The 1981 Computer Salary Survey and Career Planning Guide has been compiled by Source Edp, North America's largest recruiting firm devoted exclusively to the computer profession. Since 1966, our annual Survey has helped thousands of computer professionals make the best decisions for their future. And now, at the threshold of sweeping changes in the industry, this new Survey can be of particular importance to you.

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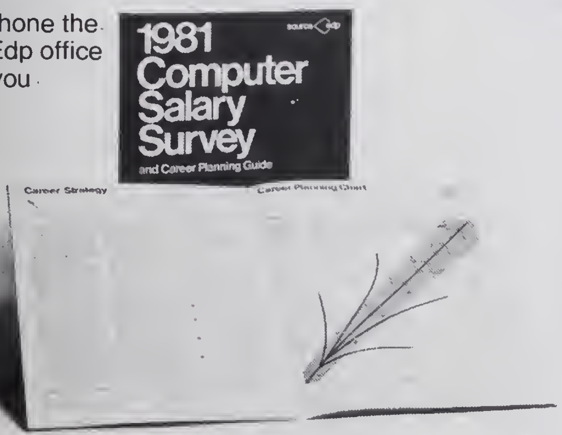

If unable to call, write:

Source Edp, Department CS1
Suite 1100
100 South Wacker Drive
Chicago, Illinois 60606

(When writing, please be sure to indicate home address and current position title.)

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Robert Half, staffed by EDP professionals for EDP professionals with 70 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

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PROGRAMMER

RPG II, Small System experience a MUST. Design and analyst exposure a real PLUS. Good growth/earnings potential. **$18,000 +**

SYSTEMS ANALYST

Degree preferred, RPG II, COBOL with Financial exposure a MUST. Good user, design interface skills a big plus. Service-oriented firm. No limit on potential. To **$24,000**

SCIENTIFIC PROGRAMMER

Degree in CS, Math, Physics or Elec Eng with C language, UNIX operating system and CDC exposure a MUST. Graphics with non-academic assembler language a PLUS. No limit on growth or earning power. To **$35,000**

PROGRAMMER/ANALYST

Degree preferred. COBOL and CICS experience a MUST. Good general bkgd with mgmt skills a real factor to client. Assistant DP Mgr slot is where job leads. To **$25,000**

Bob Baldauf
ROBERT HALF
of San Antonio, Inc.
First Natl Bnk Bldg #850
San Antonio, TX 78201
(512) 736-2467

ATLANTA

SYSTEMS ANALYST

Advancement oppty with Major Corp. Responsible for design/implementation of Automatic Storage retrieval, Distribution/Warehousing systems. Participate in Hardware/Software selection. Experience with "Mini" to large IBM communications. Work with top professionals. **$35,000**

PROGRAMMER/ANALYST

Established custom software house seeks aggressive people to program/design Accounting and Financial applications for clients on IBM's GSD products. Must be a self-starter and have user-communication skills. Excellent growth oppty. **$20,000**

PROJECT LEADER

Prefer Banking, Supervisory exp, excellent communications skills and strong desire to excel. State-of-the-art 3033 shop. Primary responsibilities will be development of new applications and supervision of programming staff. Excellent growth opportunity in highly visible position. **$28,000**

Ray Jennings
ROBERT HALF
of Atlanta, Inc.
3379 Peachtree Rd. N.E.
Atlanta, GA 30326
(404) 266-2153

SEATTLE

Major Seattle consulting firm seeks exceptional people for senior and manager positions. You need 5 to 8 years experience and top-grade technical, design, people and management skills. Minor travel. Salaries **$25,000 to $40,000**

Alaska bank needs a senior prog/analyst with 3+ yrs banking applications experience in COBOL. Will lead 3 others to develop applications. To **$30,000**

Fast growing Seattle manufacturer needs a systems analyst with 5+ yrs mfg & accounting applications programming experience Prefer DEC on-line, BASIC PLUS background. To **$27,000**

Ray Magill
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue
Suite #2626
Seattle, WA 98101
(206) 624-9000

ST. LOUIS

EDP AUDITOR/
RPG II PROGRAMMER

Fortune 100, St. Louis based firm is seeking RPG II programmers for special projects in systems and EDP Audit. Some travel. Degree preferred. To low **$20's**

SYSTEMS ANALYST

Major financial institution. A total of 6 yrs college education and DP experience required for this growth position, to perform feasibility studies, cost/performance analysis. Exceptional benefit program! To **$23,000**

MANUFACTURING SYSTEMS ANALYST

Degree required. At least 3 yrs in a manufacturing environment. MRP, inventory and floor control. IBM 4341 OS. Will supervise 2-3 prog. COBOL/ASSEMBLER. No Programming. Mid **$20's**

PROJECT MANAGER INVENTORY MANAGEMENT SYSTEMS

Complete and autonomous responsibility for design, budget, schedule, coordination, training programs and implementation of inventory management systems. Degree, good user skills required. Wholesale distribution, over 30 sites on-line. To **$35,000**

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IBM 43XX and 303X CICS shops. **$20's**

Charles Shaffer
ROBERT HALF
of St. Louis, Inc.
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

DALLAS

PROGRAMMER/ANALYST

Several North Texas based clients need sharp people to take key role in new applications development. Requires a minimum of one year experience utilizing IBM DOS or OS COBOL. To **$26,000**

SYSTEMS 3 & 34

Have varied assignments available for individuals with at least two years IBM Systems 34 experience. Positions range from programmer level to management. To **$24,000**

John Staiger
ROBERT HALF
of Dallas, Inc.
Two NorthPark East, #750
Dallas, TX 75231
(214) 363-3300

Specializing in E.D.P. positions (not just jobs).

MILWAUKEE

MANAGER SYSTEMS DEVELOPMENT

Degreed prc needed for newly-created position. Musts are manufacturing background, good user contact and supervisory experience. Excellent growth company. Salary low **$30's**

SENIOR SYSTEMS ANALYST

3 years COBOL experience in insurance applications required. Solid work history can be substituted for a degree. Great career move. Salary **$25,000**

Tom Thorstad
ROBERT HALF
of Wisconsin, Inc.
777 E. Wisconsin Avenue
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

PORTLAND

LEAD PROGRAMMER/ANALYST

Major regional client seeks 3+ yrs expr in solid design & analysis in financial systems on large scale CPU. Prefer project leader, COBOL, CICS expr. Salary **$23-29,000**

SR PROG/ANALYST

Growth-oriented Portland based company seeks 2+ yrs COBOL with IBM/DOS/VS. Heavy user contact. Prefer insurance background & on-line expr. Salary **$21-26,500**

Bob Clawson
ROBERT HALF
of Portland, Inc.
1 S.W. Columbia
Portland, OR 97258
(503) 222-9778

BOSTON

TECH WRITER

Major mini-computer vendor seeks software writer to support data base product line. Will plan, coordinate & implement new doc stds. Ind ldr offering unlimited creative writing oppty. Salary **$24,000** range

IMS DESIGNER

Prosperous state-of-the-art distributor seeks top-notch DB/DC analyst for new devel projs. IBM 370 OS/VS1, IMS environ. Oppty to join a small prof corp staff with growth-minded mgmt team. Salary **$30,000** range

COBOL SUPPORT

Fast-growing consulting org seeks indiv with min 9 months exp to take on new develop projs under progressive team ldr. IBM 370 OS, COBOL bkgrd pref. Will train in CICS. Incentive bonus & tuition reimb. Salary **$18,500**

CLIENT SUPPORT

Rapidly growing software products co seeks BAL & COBOL P/A for IMS DB support grp. Hvy client-oriented environ requiring effective communicator. Advancement limited only by indiv initiative & desire. Salary to **$27,000**

NEAT-3 ANALYST/PROG

Respected EDP svcs corp req tech oriented indiv for devel of on-line fin'l apps. NCR 8565/VRX, NEAT-3, COBOL, TRANPRO environ. Will be groomed for tech grp mgmt. Salary **$25,000** range

RETAIL SYSTEMS ANALYST

Leading retail chain seeks sr systems analyst to lead in the design of new apps. Large IBM VM COBOL CICS environ. Retail or POS exp pref. Hi-visibility position leading to mgmt. Salary **$28,000**

DOS SYSTEMS PROGRAMMER

Recognized mfg firm req exp'd sys prog to support IBM 370/145 DOS/VSE environ. Will install IBM 4341 & 8100's next year. Must have solid CICS & BAL exp. COPICS & mfg sys a plus. Will relocate from Northeast. Salary **$33,000** range or negotiable.

Gerry Battista
ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

BALT / WASH / RICHMOND

PROG/ANALYST

Tuition aid, financial and professional growth! This Fortune 500 company has very low turnover! They provide technical sophistication and a "state-of-the-art" shop! Required: 2 years' experience in program analysis, COBOL on IBM 370. **$26,000**

ROBERT HALF
of Baltimore, Inc.
217 The Quadrangle
Baltimore, MD 21210
(301) 323-7770

ROBERT HALF
of Washington, Inc.
7316 Wisconsin Ave.
Washington, DC 20014
(301) 652-1960

ROBERT HALF
of Richmond
830 E. Main Street
Richmond, VA 23219
(804) 648-3677

HARTFORD

ASST VP

New Eng insurer seeks exp'd exec to direct expansion of its grp DP div. Excellent sr level oppty. Salary to **$50,000**

DATA COMM'S SUPPORT

Lg nat vendor seeking deg'd indiv's to provide IBM/GE TP & network planning. Openings in New Eng & along E Coast. Salaries to **$33,000** + excellent benefits.

DATA BASE PLANNERS

Conn/W Mass oppty's for indiv's with min 2 yrs exp in IMS, CICS or IDMS software. Will provide corp planning for major expansion. Salaries to **$31,000**

APPLICATIONS TECHNOLOGIST

Assume a hi-visibility role for a premier Conn based corp. If you are now in tech support with prior apps exp on lg scale IBM hardware, this may be the challenge you are seeking. Analyze & evaluate the latest software & measure sys productivity. Salary to **$30,000**

CICS TRAINING

COBOL prog/analysts with min 2 yrs exp pref in mfg sys. Upgrade yourself technically while assuming a visible role with excellent firm. Our client is offering CICS training for this 1981 addition to staff. IBM, OS, JC req'd. Salary to **$27,000**

MGR TELE-COMM

Conn oppty for exp's data comm indiv to direct new Voice, Data and Video comm's project using satellite transmission. Salary to **$35,000**

SR EDP INSTRUCTOR

Central Conn corp seeking educational pro with 5 yrs prog exp & 2 yrs IBM/MVS COBOL, JCL & utilities coupled with teaching exp. Excellent modern facility on campus-like setting. Salary to **$30,000**

Stan Durbas
Paul Melssner
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

LOUISVILLE

EDP CONSULTANTS

Several positions are available for experienced people in systems evaluation, procedures and application development. A background in healthcare, manufacturing, government or banking is desired. Mini and large systems. Pluses are a CPA, MBA, or Big 8. Salary to **$40,000**

D P MANAGERS

Many opportunities in the Midwest and Southeast exist for managers with System 34 and 38 experience. RPG II & III. Degree is a plus. Relocation and interview expenses are paid. Salary to **$28,000**

PROGRAMMERS

Louisville and surrounding area firms are looking for COBOL and Assembler programmers. With 1 or more years working experience you can advance your career. IBM, UNIVAC, System 34, Honeywell or Wang.
With degree salary to **$28,000**
With no degree salary to **$24,000**

Tom Williams
ROBERT HALF
of Louisville, Inc.
680 South Fourth St.
Louisville, KY 40202
(502) 585-1751

PROVIDENCE

IMS ANALYST

Rapidly expanding hi-tech mfr seeks sr analyst to design IMS applications. DL/1 Command level CICS and COBOL desired. 3031 DOS/VM environ. Career growth to project leader. Salary **$26,000** range

TELECOMMUNICATIONS ANALYST

Recognized mfg firm seeks ambitious EDP pro for rapid advancement in telecommunications. New VTAM & on-line devel. Extensive DOS COBOL & RPG II skills req. Attractive future prospects and working conditions. Salary **$25,000** range

UNIVAC-1100-COBOL

Prominent mfr seeks prog & systems design exp with project mgmt potential. EXEC 8, DMS, 1100, TIP, CMS exp pres. Salary **$25,000** range

PROGRAMMER ANALYST

Major RI co desires analyst with strong COBOL skills. IBM data base environ. Insurance exposure a +. Dynamic systems devel oppty. Salary **$24,000** range

SYSTEMS ANALYST

Successful RI seacoast mfr desires sr analyst for major on-line data base systems implemen. Strong analytical skills a must. Project leadership potential. Salary to **$26,000**

Bob Lathrop
ROBERT HALF
of Providence, Inc.
400 Turks Head Bldg.
Providence, RI 02903
(401) 274-8700

Seventy offices throughout the United States, Canada and Great Britain.

BUFFALO

SYSTEMS ANALYST

Internat co needs analyst for corp level pos. Bkgrd must be mfg co oriented. Client needs hvy design & implementation exp to head up project for total design function. Hvy user interface. **$29,000**

PROGRAMMER ANALYST

Intimate Sys 3 shop presently converting to IBM 4331. Min 2 yrs RPG II prog + COBOL ideal. Expanding & implem on-line CICS & DOS/VSE. Excellent visibility. **$22,000**

SYSTEMS ANALYST

Newly approved proj ldr pos for profitable div of WNY mfr. Bkgrd must include mgr control sys, ie, prod control, MRP, etc. Must be able to work with little supv. **$28,000**

PROGRAMMER ANALYST

Div of Fortune 500 needs prog with fin'l systems exp. COBOL a must. On-line, IBM 4341, IMS installation. Pos rpts directly to MIS mgr. **$25,000**

DP SUPVR

Capital goods mfr needs shirt-sleeve mgr. Completed conversion to Sys 3 installation & co requires RPG II prog, mfg sys design & mgmt bkgrd. Pos rpts to gen mgr. **$25,000**

Pam Siegal
ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 842-0801

ROBERT HALF

KANSAS CITY

SR ANALYST

Take charge of major new development project in state of the art MVS shop. All new design. All on-line. Have complete project control from start to finish. Exceptional visibility to top level corporate VP's. Proven track record of taking project into production required. Salary to **$34,000**

MANAGER

Fast growing suburban 34 shop requires a take charge manager to head a staff of two programmers forward to a totally on-line environment. Excellent exposure to top management with opportunity to build staff and upgrade equipment. Excellent MBO benefits.
Salary to **$30,000**

PROG/ANAL

Suburban state of the art MVS shop has an immediate need for an assembler programmer who knows OS JCL. Person will be assigned to work an on-line CICS project. Excellent benefits. Salary to **$31,000**

PROG/ANAL

Fast growing KC based retail group seeks aggressive COBOL prog/anal to take charge of their installation of mini computers for point of sale and order entry systems. Experience with NCR equipment would be helpful. Must be capable of working on your own and willing to travel 20%. Excellent benefits.
Salary to **$28,000**

JUNIOR SOFTWARE PROGRAMMER

Excellent opportunity for the assembler programmer to move into the software side of the house. Demonstrated skills in assembler qualify for this on the job training in this state of the art MVS shop. Initial responsibilities will be in support for the communications network with subsequent training in data base support. Excellent technical education will be provided in all phases of MVS support. Salary to **$25,000**

JUNIOR ANALYST

Tired of programming and wanting to be trained in Systems Analysis? If you have one year of solid COBOL experience on large systems you may qualify to be trained to be an analyst for this fast growing firm. Good communication skills and the ability to learn will be required to keep pace in this fast track organization. Complete training in structure design techniques provided.
Salary to **$20,000**

George Waterman
ROBERT HALF
of Kansas City, Inc.
127 W. 10th
Kansas City, MO 64105
(816) 474-4583

ALBUQUERQUE

IBM LARGE SCALE

Major energy co seeks programmers and analysts at all levels. Requires IBM large scale in COBOL. Growth Oppty. Salary to **$28,000**

BANKING

Expanding bank group seeks programmers with banking applications exp. Requires COBOL, any hardware. Excellent fringe benefits.
Salary to **$25,000**

Dick Starnes
ROBERT HALF
of New Mexico
P.O. Box 3320
Albuquerque, NM 87190
(505) 884-4557

NEW YORK

360-4331 CONVERSION

Exciting opportunity in high profile environment with this major LAW FIRM. 2+ years COBOL programming experience. 360 DOS converting to 4331 in Jan '81. Aid in conversion from batch to ON-LINE. 4 weeks vacation. **$28,000**

DEC 11 BASIC

Rapid advancement opportunity for an up-and-coming computer pro. 2+ years BASIC PLUS or COBOL programming and RSTS/E experience. Company converting from IBM to DEC. Outstanding benefits include 30 days vacation. Career climbing opportunity.
$27,000

4341 COBOL

Frequent contact with upper level management during conversion to 4341 Jan '81. 2+ years COBOL programming with CICS experience. Responsibilities include INVENTORY and FINANCIAL applications in very dynamic data center. Superior opportunity. **$30,000**

RPG II

Potential for significant career growth in this multi-computer environment. 2+ years RPG II programming with some design experience. Responsibilities include design through implementation of commercial applications. Plenty of room for advancement. **$26,000**

ANALYST DEC 20/60

Join top talent with this nationally recognized INVESTMENT firm. 2+ years systems design with COBOL and FORTRAN programming and TOPS 20 experience. Applications are financial in DEC 20/60 and 20/20 environment. **$29,000**

BASIC DP MGR

Attractive management position for shirt sleeve DP pro. 3+ years programming and managing in MINI computer environment using BASIC. Total responsibility for DP including staff management and systems design through implementation. Excellent benefits and congenial working environment. **$29,000**

Marty Amato
ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

DENVER

MANAGEMENT

Dynamic Colorado based subsidiary of major energy corp is currently seeking a manager of systems and programming. Must have in depth knowledge of oil and gas accounting applications and be able to supervise a staff of 7-10 professionals. Excellent career opportunity.
Start **$45,000** range

PROGRAMMER/ANALYST

Rapid expansion has created a new position for programmer analyst with at least 3 yrs COBOL experience. Must have extensive accounting applications background and be able to work well with users.
Start **$26,000** range

ROBERT HALF
of Denver, Inc.
2 Park Central
Denver, CO 80202
(303) 629-1010

NORTHERN CALIFORNIA

PALO ALTO SAN JOSE SAN FRANCISCO

D P MANAGER

System 34, RPG II, Multiple Openings. To **$40,000**

SR PROGRAMMER ANALYST

3+ yrs. RPG II, System 34 on-line. To **$28,000**

TECHNICAL SERVICES MGR

Prior Supervision and Systems/Operations exp Hardware Planning. To **$40,000**

JR SYSTEMS PROGRAMMER

Assembler, COBOL, IBM environment. To **$20,000**

PROGRAMMER

PL 1, IBM O S. To **$22,000**

OPERATOR

370/158 DOS/VS, VS1, VM.
To **$17,000**

SYSTEMS ANALYST

COBOL, IBM 370/OS. Financial Bkgd. Multiple Openings.
To **$30,000**

PROGRAMMING SUPERVISOR

Prefer HP 3000, COBOL or FORTRAN. To **$30,000**

PROJECT LEADER

COBOL, B-6800, DMS II, GEMCOS. To **$29,000**

SUPERVISOR DATA ENTRY

2 years mini's or Data Entry. IBM environment. Other Positions available in DATA BASE ADMINISTRATION, EDP AUDITING, and OPERATIONS.

Client Companies pay interviewing and relocation expenses. Call us collect today.

ROBERT HALF
of Northern California, Inc.
Personnel Service

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2 Palo Alto Sq., #212
Palo Alto, CA 94304
(415) 493-8700
or
675 N. First St., #609
San Jose, CA 95112
(408) 293-9040

Jerry Anderson
Bob Couch
or
Linda Strickland
111 Pine St., #1500
San Francisco, CA 94111
(415) 434-1900

MIAMI

PROGRAMMER ANALYSTS

Due to this corporation's unprecedented growth in their marketplace and long term commitments to state-of-the-art technology, several positions as Prog/Analyst are available. An in depth knowledge of COBOL, commercial/MIS applications in a large IBM environment are necessary to qualify for this progressive staff. Training in top-down structured methodology and Data Base techniques are offered as part of the career path. Excellent benefits. Salary to **$26,000**

Chuck Neil
ROBERT HALF
of Miami, Inc.
1395 N.W. 167th St.
Suite 100
Miami, FL 33169
(305) 625-5433

MINNEAPOLIS/ ST. PAUL

EDP CONSULTANT

Excellent growth potential in a fast-track, hi-image CPA firm. Rather than doing maintenance, working on one project or sitting in a cubicle you can be meeting with clients, designing a variety of systems and working in a state-of-the-art environment! You need 2+ yrs design & coding exp, a 4 yr degree and an aggressive personality. Salary to Low **$30's**

MANAGER MIDWEST

Regional client is seeking an experienced MAS professional to develop a new MAS staff. This extremely challenging position requires 4+ yrs of consulting exp, good communication skills and a solid knowledge of the DP profession. Degree required of this self-starter. High growth Upper Midwest location.
Salary to Mid **$40's**

MANAGER NORTHWEST

Big 8 CPA firm currently has a need for a high image professional with 8 plus years in the CPA environment. They prefer strong acctg, mfg and financial applications in an on-line environment and excellent communication skills. Partnership potential. Salary to **$40,000**

Ron Dykstra
or
Kathi Grant
ROBERT HALF
of Minneapolis/St. Paul, Inc.
2236 IDS Center
Minneapolis, MN 55402
(612) 339-9001

DAYTON

ORDER PROCESSING ANALYST

Are you exp'd with mfg order processing? If you have implemented or been part of implementing this type of system this nationally known industry leader will interview you by phone. Profit sharing, tuition and more. **$30,000**

ROBERT HALF
of Dayton, Inc.
One First National Plaza
Dayton, OH 45402
(513) 224-0600

PHOENIX

Large Phoenix based corporation seeks data communications specialists with experience in CICS environment using on-line monitors, system utilities and BAL. Excellent benefits and career advancements.
Starting salary to **$28,000**

Roc Rogers
ROBERT HALF
of Phoenix, Inc.
3550 N Central, Ste 1504
Phoenix, AZ 85012
(602) 264-6488

SOUTHERN CALIFORNIA

LOS ANGELES

PROGRAMMER ANALYSTS & SYSTEMS PROGRAMMERS

Needed by new IBM 4331 installation in San Diego. Planned CICS & DC/I installation.
To high **$20,000's**

Duncan White
ROBERT HALF
of Los Angeles, Inc.
3600 Wilshire, Suite 2000
Los Angeles, CA 90010
(213) 386-6805

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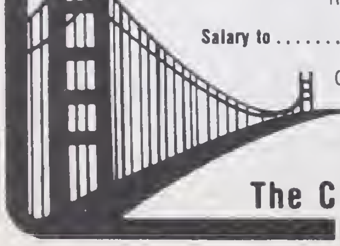

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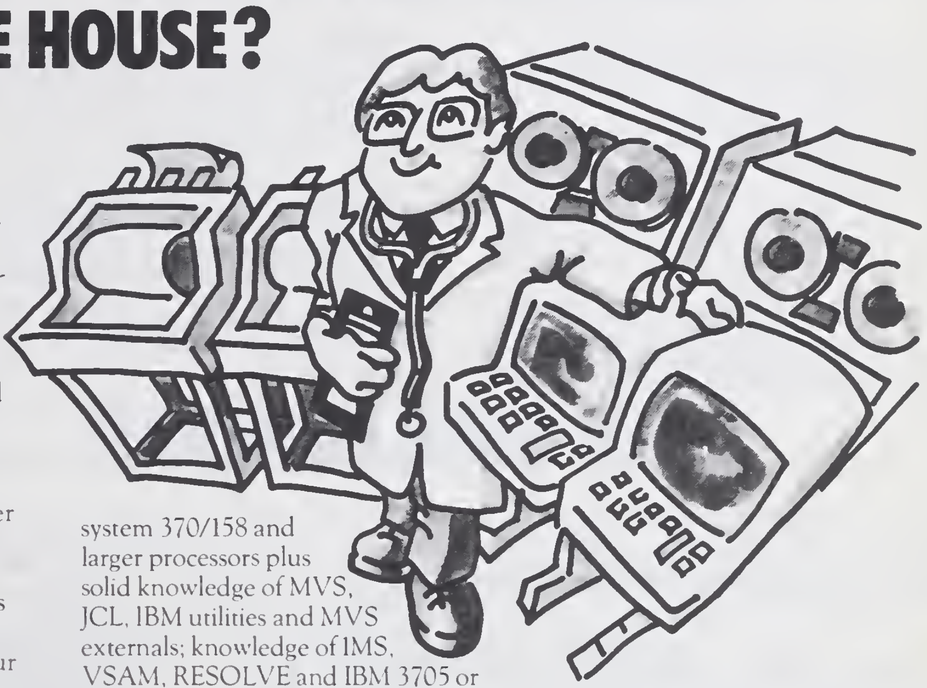

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- 1 year experience in coding IBM 370
- COBOL
- MVS/TSO environment

SYSTEMS DESIGNERS

- 3 years experience in Systems Development and Data Processing
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- Supervisory or lead operational experience in large scale IBM shop
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We offer excellent compensation, benefits and paid relocation. Send resume in confidence including salary history and requirements to:

Vivian Khoury
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DATA PROCESSING

COLORADO ROCKIES

Growing Western Colorado utility company with 900 employees is seeking qualified candidates. IBM 370/158, MVS, TSO, CICS. Experienced candidates are sought in the following areas:

- **Shift supervisors**
- **System analysts**
- **Software engineers**
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As a respected member of our dynamic growth picture, you will receive a salary commensurate with experience, a full benefits package and growth potential. Please forward your resume, outlining experience and salary history, in confidence to:

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Colorado-Ute
Electric Assn., Inc.
Box 1149
Montrose, Colo 81401

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DATA PROCESSING MANAGER

Involves supervision of all phases of the data processing system of a medium sized hospital. Interfacing with management level personnel required.

The successful candidate must have experience with the Univac 90/-30 system and be proficient in Cobol and RPG II. Hospital experience helpful.

Interested candidates should forward their resumes to:

Mr. Jim Cannon
713/245-6383
Matagorda County
Hospital District
1115 Ave. G
Bay City, Texas 77414

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We are SYNTREX, a company in the growth field of the 80's: Office Automation. We are seeking talented individuals with interest/experience in the design/implementation of (1) Data Dictionary/Query Systems (2) Sophisticated Tech/Word Processing. A knowledge of UNIX, C or a high level language is desirable.

Write or Call Phil Shevrin
SYNTREX
Industrial Way West
Eatontown, New Jersey 07724
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software professionals

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Apple Computer, an aggressive leader in the personal computer industry, has outstanding career opportunities available for experienced software professionals in the following areas:

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If you are a software professional, Apple can offer you one of the best fringe benefits packages in the San Francisco Bay Area. Please send your resume to **Vicki Milledge, Employment Supervisor, Apple Computer Inc., 10260 Bandley Drive, Cupertino, CA 95014** or call **(408) 446-8429**. An equal opportunity employer m/f/h.

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For more details, please forward your resume to: H. Michael Boyd, Digital Equipment Corporation, Dept. G112 3807, 200 Forest Street, Marlboro, Massachusetts, 01752.

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Major INDEPENDENT ENERGY client is seeking an experienced professional with the following qualifications: (1) BA/BS in Physical Science, Engineering, or Business, (2) IMS DB/DC DESIGN experience, (3) Language proficiency in either COBOL, PL/1, or ALC, and (4) at least five years of computing experience. A knowledge of MARK IV and ADF would be very helpful but not necessary. The successful candidate will act as TECHNICAL ADVISOR to Applications Development Teams.

Houston Positions To **$45,000**
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Computer Sciences Corporation

CSC's INFONET Division markets and operates an international information network which provides remote computing services to organizations in finance, industry and government. Our exceptional record of progress creates virtually unlimited opportunity for ambitious professionals, in locations at major cities across the nation from Washington, D.C. to San Francisco.

We seek hard-hitting, people-oriented individuals to fill these important assignments:

Branch Managers

Will hire, develop and review branch personnel, maximize customer satisfaction, and implement marketing programs to help ensure achievement of revenue and cost control goals. Candidates must have a thorough knowledge of the computer services or remote computing industry, with 3-5 years sales experience and progressively responsible managerial exposure.

Marketing Representatives

To sell the full range of INFONET products and services. Ideal candidates will have strong communicative skills, keen problem-solving abilities, and 3-4 years experience selling time-sharing, remote computing or other DP services. Degree desirable, as is experience selling in the Fortune 1000 marketplace.

Customer Systems Representatives

Will provide technical expertise for new and existing accounts with emphasis on troubleshooting. Experience with FORTRAN and data base management (preferably in a network environment) is required, with knowledge of medium to large scale hardware and software systems. Proven communicative strengths are essential.

Computer Sciences Corporation affords a very creative, stimulating professional atmosphere, enhanced by excellent advancement potential and a very attractive total compensation program.

For positions west of the Mississippi, send resume to Mr. Cris Cristina, Computer Sciences Corporation, 650 N. Sepulveda Blvd, El Segundo, CA 90245. **For positions east of the Mississippi** contact Ms. Jackie Harper, TOLL FREE, 800-336-3066 or 703-841-3500 Ext. 353 or send resume to Ms. Harper, Computer Sciences Corporation, 1616 N. Fort Myer Drive, Arlington, VA 22209.

The only limitations are the ones you bring with you.

CSC
INFONET DIVISION
An Equal Opportunity Employer M/F/H

SYSTEMS PROGRAMMER TOPS-20

We seek an individual to work on the design and implementation of System Software Modules for the TOPS-20 monitor and other system software. Duties will include implementation and extension of network software for high bandwidth local networks, ARPANET Software, and virtual terminal software.

Candidate should have an M.S. in Computer Science or equivalent experience.

MIT is an affirmative action employer and welcomes applications from women and minority group members. Please send resumes (reference job no. R80-347) to:

Ms. Diane Wharen
Laboratory for Computer Science
545 Technology Square
Cambridge, Ma. 02139

Director of Engineering & Scientific Applications

40 hour week, $35,800 per annum. Requirements B.S of Science or equivalent in Engineering or Mathematics, two years experience in the position or 5 years as a Sr Engineer Systems Analyst, knowledge and experience in the integration of computer systems into engineering applications. Duties. hiring of senior technical consultants for scientific computing applications, coordinating the efforts of 15 engineers on various computer projects, engaging in technical discussion and liaison with prospective clients and writing proposals to indicate how the goals of the clients can be accomplished. Send resume to **Robert L. Jacobs, Cera Corporation, 611 E. Butterfield Rd., Ste. 110, Lombard, IL 60148.**

Geisinger Medical Center

Major MIS Expansion

Large, rapidly expanidng tertiary care regional medical center, located west of the Pocono resort area in scenic North central Pennsylvania has immediate career opportunities for the MIS professional seeking technical development, advancement and visibility. The following positions have been created as a result of internal growth and continued expansion of the information systems organization.

Supervisor Technical Support

Supervise the technical support group in a large scale Honeywell 6000 environment. Experience GCOS, IDS, TDS, and NPS is required. Previous supervisory experience preferred.

Sr. Analyst Programmer — Financial Systems

Will be team leader responsible for installing MSA general accounting applications. Experience in installing MSA General Ledger and Payroll/Personnel is required in addition to COBOL programming.

Analyst/Programmer

Will assist in implementing MSA General Accounting applications. Financial background and 2 years COBOL experience required. MSA experience a definite plus.

Analyst/Programmer — Clinical Research

COBOL experience with strong math background required. Experience with SPSS, SCSS or BMD is preferred.

Application Programmers

Two years COBOL experience required. Experience in Database and on-line communications concept preferred. Honeywell 6000 exposure a definite plus.

Geisinger Medical Center is pursuing an aggressive program to develop a share data center for multiple organizations. An aggressive, results oriented management team provides an environment for excellent growth. Competitive salary and benefits. Send resume, including salary requriements to **Doug Chiado, Personnel Dept., Geisinger Medical Center, Danville, PA 17822**

EOE M/F/H

Rexham Corporation, a Charlotte based manufacturing firm listed on the NYSE, is expanding its Corporate Data Center to meet increasing user demand for high quality on-line systems. This expansion has created positions in the following categories:
SENIOR SYSTEMS ANALYST

Manage a small project team of programmers and analysts to develop and support on-line manufacturing systems written in ANSI 74 COBOL.

SENIOR PROGRAMMER ANALYST and PROGRAMMER ANALYST

Design, code, test, and implement major on-line manufacturing systems through direct interaction with users.

SENIOR SYSTEMS PROGRAMMER

Development and support of systems software in BAL as a member of strong technical support group.

These positions require at least 2-5 years' experience in development of on-line systems, based on the level of the position, and in general, have the following additional requirements:

- strong math background, with BA in Math, Computer Science, or Engineering; Master's a plus;
- skill in systems design, architecture, and user communications;
- considerable experience and facility with the ANSI 74 COBOL language (except Senior Systems Programmer);
- strong orientation toward technical competence;
- experience in the IBM 370/OS and/or UNIVAC 90/60-80 VS/9 environment.

As a member of this small core of computer science professionals, you will enjoy the challenge of working in an environment where technical skills are highly valued and rewarded. Our Data Processing Group is young and growing, through the sound development and implementation of high quality systems. The user and management relationship is very positive and productive, with considerable room for the creative individual. Our hardware environment is a UNIVAC 90/80-3 running VS/9 in support of over 50 on-line terminals, with movement toward distributed computing systems for some remote sites.

We offer competitive salaries and excellent benefits, including relocation reimbursement. Interested individuals are requested to send a resume, including salary requirements and position preference, in confidence, to:

Personnel Manager
Rexham CORPORATION
P.O. Box 4068, Charlotte, N.C. 28204

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    - Knowledge of CICS, CMS, TSO
      - Implement operating system enhancements

We offer an excellent salary and company paid benefits which include, free parking; health, dental, life and disability insurance; paid vacation; sick leave, tuition reimbursement; pension plan; stock options and more.

Please send resume and salary requirements, or call:

Ron Pearce
Corporate Personnel Recruiter
412/931-7600

ON-LINE SYSTEMS INC.
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115 Evergreen Heights Dr., Pittsburgh, PA. 15229

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EOE

SOFTWARE WANTED

Can you use additional income? The Computer Consultant newsletter is now running a SOFTWARE WANTED section composed of notices from organizations interested in purchasing computer programs. Software houses, consultants, free-lance programmers and others who feel that they can meet the request can then establish direct contact with the potential client. The Computer Consultant is a monthly newsletter featuring articles of interest specifically for consultants and free-lance programmers. For more information, write: **Battery Lane Publications, P.O. Box 30214-DX, Bethesda, MD 20014.**

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Are these some of yoru goals? If so, why not become part of a team that can offer the recognition and advancement you deserve. Our DP environment is expanding and we need strong, talented individuals to help speed this growth. In addition to our current mix of IBM and PDP hardware, we are installing a 4341 for our on-line applications and are embarking on an ambitious development plan.

If you are an aggressive, results oriented individual with good communication skills and your background includes:

- **DOS/VS or VSE**
- **CICS**
- **Data Base**
- **Structured design techniques**

then one of the following positions may be for you:

MANAGER, TECH SUPPORT

Supervise staff of systems programmers in supporting current software. Plan and coordinate installations of 4341. Train staff in on-line and data base techniques.

PROJECT LEADER

Form and lead development team in the conversion of on-line systems to the 4341. Develop comprehensive computer system to deal with growing business requirements.

ANALYST & PROGRAMMER ANALYST

Participate in development and implementation of integrated business systems such as inventory control and distribution.

These positions offer excellent insurance benefits, profit sharing program, company-paid moving expenses, temporary living expenses during relocation period and ONE MONTH EXTRA PAY incidental moving expense payment. All of this, plus we are an established firm located in the heart of scenic North Central Pennsylvania.

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Associated Grocers, Inc., a leading Northwest wholesale distributor, has several outstanding computer science positions available.

- * Data Base Analyst
- * Programmer/Analyst
- * Technical Writer

Data Base Analyst — Senior data base analyst to replace DRA who has moved into management. Heavy interface with entire system and programming staff. Responsibilities will include quality assurance of data base contents, maintenance of standards management and users education and efficiency analysis. Position requires IDMS experience. COBOL/-CICS command-level/MVS/OLQ experience will be an additional asset.

Programmer/Analyst — We are seeking top flight Programmer/Analysts who are interested in excellent growth opportunities utilizing your degree or work experience in a progressive data processing department. If you have a minimum of two years COBOL experience in an OS environment with additional experience of CICS command-level/IDMS/-MVS we are interested in talking with you about a future with our organization.

The above positions are available immediately with excellent salaries and an outstanding benefits program. Please send resume or contact:

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Software Methods Consultant

This expert will assist those company organizations whose staffs are engaged in software engineering to upgrade their skills and introduce measures for quality improvement. The individual should be able to assist in the design and delivery of remedial training programs.

Direct experience is needed in real-time systems and distributed processing, using networks involving combinations of hardware such as large processors and mini-computers. Experience with complex software outweighs experience in any specific hardware.

We expect the individual we seek will have an advanced degree in computer science with approximately ten years experience in software management and programming. His or her experience will have emphasized application programming of large-scale systems for end users. He or she will have demonstrated an awareness of the problems of developing realistic schedules and budgets for large software projects and an ability to manage software applications while adhering to schedules and budgets.

This is an exciting professional opportunity to do challenging work for a fascinating company—while living in a Benelux country for the two-three year contract period and engaging in moderate travel in Western Europe. To learn more about this most unusual opportunity, please send a resume with salary history and requirements to Albert Kreger at

Moshman Associates, Inc.
Consultants to Management
6400 Goldsboro Road, Washington, D.C. 20034

DATA PROCESSING MANAGER
COMPUTER PROGRAMMERS
SYSTEMS ANALYST

HAMAD GENERAL HOSPITAL
DOHA, QATAR
ARABIAN GULF

DATA PROCESSING MANAGER, 2 COMPUTER PROGRAMMERS and SYSTEMS ANALYST sought to initiate computer system for the new 660-bed Hamad General Hospital in DOHA, QATAR on the ARABIAN GULF

SALARIES are attractive and BENEFITS excellent, including free furnished housing, air tickets to and from Doha for a family of five, 45-60 day paid vacation at the end of each 12-months of service, liberal allowances for relocation, local travel and children's education.

Interviews to be held in the U.S. in late March 1981.

Candidates are invited to send their complete resume with telephone numbers to: **Dr. G. Gilbert Talleu, Director of Personnel Affairs, Hamad General Hospital, c/o University Associates, 398A Brookline Avenue, Boston, Massachusetts 02215.**

TENURE-TRACK POSITION
Computer/Information Science

Requires Ph.D. in computer science or mathematics and teaching competence for advanced undergraduate courses in computer science. Experience in information science preferred. Duties include teaching 9 credits per semester, a research program for advancement, and curriculum development in the information science program. Salary competitive. Send complete resume and names of 3 references before March 1, 1981 to Department of Mathematics, Indiana University Northwest, Gary, IN. 46408. AA/EOE.

DATA PROCESSING: Position available August 1981. Teach programming and information systems. Doctorate, and teaching or business experience preferred. Salary and rank competitive. Reply immediately with resume and request three references sent to Dr. George Grill, Search Committee, School of Business and Economics, University of North Carolina at Greensboro, Greensboro, NC 27412. Affirmative Action/equal opportunity employer.

Faculty Positions Computer Applications

The University of Pittsburgh at Johnstown, a four-year college of the Pitt system, announces three Assistant Professor positions in Computer Applications for Fall 1981. Departmental concentrations include Numerical Computing, Information Processing, and Industrial Computing leading to a B.S. degree

Candidates should demonstrate strength in at least two areas chosen from Modeling/-Simulation (GPSS), Operations Research, Numerical Analysis, Assembly (PDP-10, 11), Programming Languages, Operating Systems. They should possess a Master's Degree although equivalent job experience will be considered Job requirements eight month contract includes undergraduate teaching, supervision of student projects, and ongoing professional development. Salary negotiable depending upon experience and qualifications **Send resume and three letters of reference by March 8, 1981 to: Dr. H.D. Callihan, Computer Applications Faculty, University of Pittsburgh at Johnstown, Johnstown, PA 15904.** UPJ is an Equal Opportunity/Affirmative Action Employer

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Systems Analyst/Programmer II
1401-1794

The University of Washington is seeking an experienced Analyst/Programmer for a research project involving the analysis of health care data The successful applicant will be involved in a number of data processing tasks which include Documenting procedures, programs and file organization. Writing FORTRAN programs and providing supervision on an occassional basis

In addition to a Bachelor's degree in a job related area or one year full-time experience as a Systems Analyst/Programmer I, applicants must possess experience with, statistical software (SPSS) data base management software (SIR), FORTRAN and experience on CDC/Cyber equipment.

For further information contact:

University of Washington
Staff Employment Office
1415 N.E. 45th
Seattle, WA 98195
(206) 543-2534

Closing date: January 19, 1981.

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We are looking for a DOS/VS(E) systems programmer to work in our small technical support group The successful candidate for this position should have over three years current experience as a systems programmer in a DOS shop that includes a teleprocessing/database environment.

We are currently using DOS/VSE, IDMS, VTAM, NCP (over 100 stations using SDLC & BSC), TASK/MASTER, LIBRARIAN, LIB/OL, LOOK, etc., on two CPU's (4341,145) with shared DASD's and tape We are contemplating migrating to VM and OS/MVS.

If you think you are capable of participating effectively in a challenging, dynamic, and growing data center, **please send your resume to Personnel Commission, Office of Education, 100 Skyport Drive, San Jose, CA 95110. EOE.**

Arizona/California/Texas/Colorado/Florida

SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. $18-35,000.

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.

For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/ Data Base. All large scale installations.

For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.

Your name, resume, and present employer will not be given out without your permission.

For sincere personal service, please send a confidential resume to:

Dan Pullman (602) 274-5660
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Caron International, a multi million dollar Corporation, has an exceptional opportunity for an individual with previous experience (5-10 years) as an EDP Manager working with either the IBM 370 or 4300 series. Must have previous background with the following disciplines: ANSI/COBOL, DOS/VSE, CICS, ETSS/ICCF/Power. Qualified candidate will receive an outstanding company paid benefit program plus an excellent opportunity to grow both professionally and personally.

For more details send resume in confidence to
Director of Personnel

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Join forces with NCR and enjoy numerous opportunities for career advancement, an excellent starting salary, comprehensive benefits (including relocation assistance), and all the advantages of Dayton living.

For prompt consideration, send your resume and salary history to: Mr. Larry Combs, Dept. F54, NCR Corporation, Engineering and Manufacturing, Dayton, Ohio 45479.

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An equal opportunity employer

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2) Operational knowledge of hardware and software utility routine maintenance.
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$18 to $28K

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Several of our Bay Area clients have immediate openings for IMS Programmer Analysts. Positions require a minimum of 2 years in Data Processing with 1 year in IMS COBOL applications. Prefer Manufacturing, Finance or Distribution Applications. Positions include relocation and excellent benefit packages. Salary commensurate with abilities.

We are consultants to management. For immediate and confidential consideration send detailed resume to **CW Box 2419, 375 Cochituate Rd., Rte. 30, Framingham, MA 01701.**

Employer assumes fee

UNIVERSITY OF PETROLEUM & MINERALS
DHAHRAN, SAUDI ARABIA

COMPUTER SCIENCE DEPARTMENT

LECTURER OPENINGS

The Computer Science Program has several openings for lecturer positions involving teaching of programming languages and the participation in a number of projects among which are the computer-aided instruction and the Computer Graphics Projects. The positions are open for the academic year 1981-82, starting 1 September 1981.

Candidates are expected to have MS degree in Data Processing, Computer Science Program, or an equivalent degree in a related field, with a working knowledge and/or experience of COBOL, PASCAL, 370 Assembler Language, FORTRAN, PL/1, Data Base Organization, operating system, or similar areas.

Facilities available are IBM 370/158, IBM 3033, and various minicomputers and microprocessors.

Minimum regular contract for two years, renewable. Competitive salaries and allowances. Air conditioned and furnished housing provided. Free air transportation to and from Dhahran each year. Attractive educational assistance grants for school-age dependent children. All earned income without Saudi taxes. Ten months duty each year with two months vacation with salary. There is also possibility of selection for University's ongoing summer program with good additional compensation.

Apply with complete resume on academic, professional and personal background, list of references, publications and research details, and with copies of transcripts and degrees, including home and office addresses and telephone numbers to:

**University of Petroleum & Minerals
Houston Office
2223 West Loop South, Suite 410
Houston, Texas 77027**

SOFTWARE PROFESSIONALS

Some of New England's finest companies rely heavily on E.P. Reardon Associates to assist them in finding software professionals. Two of our clients have expressed an urgent need for talented software engineers with the qualifications listed below:

SR. SOFTWARE ENGINEER-PDP11 To 30K

Lead technical role responsible for systems design, RSX-11M operating systems knowledge is essential. Experience with networking, I/O drives, diagnostics or other areas helpful.

DATA COMMUNICATIONS SYSTEM DESIGNER To 32K

Key spot for individual contributor in the Future Products group of this leading mini computer vendor. Requires experience with protocols, packet switching and SNA. BSEE or Comp. Sci. necessary. Advanced degree preferred. Excellent combination of tech. challenge and visibility.

CAD/CAM To 28K

Systems level software design or CAD/CAM applications experience necessary. Assembly and high level programming language knowledge required. Co. is rapidly growing leader in the design and installation of CAD/CAM systems for electronic and manufacturing industries.

OPERATING SYSTEMS To 28K

Work with a small team in the design and development of new operating systems. Experience in large, multi-user operating systems, virtual memory and sophisticated paging techniques is required.

PRODUCT SUPPORT To 28K

Provide technical support to Field Service, Sales, and Manufacturing in the solution of software problems. Strong hardware background is essential as is real-time assembly language experience.

To explore these, or many other challenging positions, please contact Dan Meagher by calling (617) 329-2660 or mail your resume to him (in complete confidence) at:

EPRA
E.P. Reardon Associates
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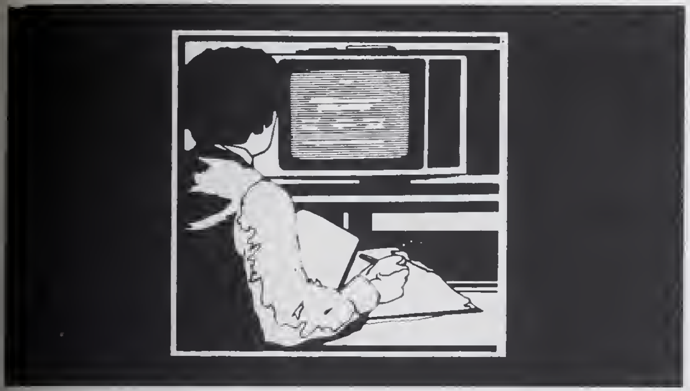

PROGRAMMER/ANALYSTS

Join the leader-CUTLER WILLIAMS Inc., in SAN FRANCISCO, LOS ANGELES, DALLAS, HOUSTON, DETROIT, CHICAGO, CLEVELAND or TULSA! Exciting cities and dynamic careers in computer software, are just part of CUTLER WILLIAMS.

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- IMS DB/DC, CICS (MACRO or COMMAND LEVEL)
- SYSTEMS ANALYSIS & DESIGN

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RICH BRZOZY
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(800) 527-4907

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Equal Opportunity Employer M/F

DRESSER IDECO, a leading manufacturer of oilfield equipment, has immediate opening at its Beaumont, Texas plant for a:

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Major responsibilities will be for the systems design, the development of program logic, coding, and testing. Duties include the de-bugging, documentation, and implementation of the system of programs. Minimum of 3 years' experience in COBOL and OS/VS1 required. Applicants should have a computer science or business related degree.

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Personnel Office
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Will perform a variety of challenging projects in support of IMS/VS, DB/DC and related software. Requires at least four years of programming experience, a thorough knowledge of OS JCL, Utilities and TSO or prior systems programming experience. Knowledge gained from applications or systems programming, data base administration, or IMS master terminal operation is preferred.

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(213) 970-4986

Or, send your resume to:

Shelley A. Farnham
Dept. NDP-CW 1/12
PO Box 584
Hermosa Beach, CA 90254

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California State Polytechnic University, Pomona invites applications for Chairperson, Department of Information Systems, School of Business Administration starting September, 1981. The School offers BS, MBA, and MSBA — EDP Auditing option, degrees. Leadership skills, a record of effective teaching, and an appropriate doctorate required. Chairperson must have ability to continue this department's leadership int he computer information systems and EDP Auditing fields by working effectively with faculty, business, and professional organizations. Salary and rank are commensurate with credentials and experience. Affirmative Action and Equal Opportunity Employer. Send resume, before February 15, 1981 to:

Dr. W. Slater Hollis, Dean
School of Business Administration
California State Polytechnic University
Pomona, CA 91766

SYSTEMS ANALYST

Hours: 40 per week, salary $24,000 per year. Requirements: B.S. in Computer Science, two years experience in the position and knowledge of Assembler program language. Duties: design software systems for micro-processor hardware to be used to initiate automatically the generating of electrical signals for energy control systems and mobile telephone systems for autos and airplanes. Send resume to **Robert L. Jacobs, Care Corporation, 611 E. Butterfield Rd., Ste. 110, Lombard, IL 60146.**

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The Systems Programming Manager will face some interesting challenges with this new equipment, new operating systems and a staff of eight to ten capable systems programmers. The salary range for this position is $28,248 to $36,156 depending on experience and qualifications. Applicants must have a Bachelor's degree or an AA in data processing; four years experience in systems software development and/or maintenance, one year of systems programmer lead experience. Background must include a minimum of one year of systems programming on CDC Cyber 170, 70 or 6000 equipment.

For information contact:

University of Washington

Staff Employment Office
1415 N.E. 45th St.
Seattle, WA 98105
(206) 543-2534
Closing date: January 26, 1981

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Applicant should be experienced in network control centers, network monitors, network planning and network problem determination. A knowledge of NCP and IBM 3705 hardware would be helpful.

SYSTEMS PROGRAMMER

Duties will include participating in a VTAM/NCP conversion of a very large nationwide network Candidates must have a VSI, MVS or NCP background, some systems programming experience, and the ability to participate in planning the company direction in network development.

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Candidates must have a data processing planning background with systems programming experience. Above average written and verbal communication skills are musts. Responsibilities will include the generation of performance reporting documents, volume projections, and the determination of hardware, software, and data center functions required to support a nation-wide on-line complex.

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Applicants should have managed systems programming and should possess above average planning and business skills. Our shop has a large AMDAHL CPU with MVS, CICS, and NCP. Applicants must be aggressive, analytical, and well-rounded in technical skills. The previous Director was successful and is now Director of an allied area due to growth.

First Data Resources, Inc. offers excellent salaries, benefits, relocation allowances and individual growth opportunities. Our advancement program is based on "can do" attitudes and problem solving abilities.

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FIRST DATA
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7301 Pacific
Omaha, Nebraska 68114
(402) 399-3866

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Our benefits are recognized as being among the most attractive in our industry, including profit sharing and stock bonus plans. Salary is commensurate with background and experience as related to our needs. If you are interested in a challenging career, send resume in confidence to:

Professional Employment
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Tucson, AZ 85734

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ANALYST/PROGRAMMERS
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We have been asked by a large banking institution to locate applicants for their new state-of-the-art data processing installation. Qualified applicants should have experience on large scale IBM 3031, 370, MVS, IMS, and COBOL. Banking applications such as mortgage loan, check processing, payroll, would be pluses. However, all candidates with large scale IBM experience will be considered Get in on a ground floor opportunity that offers excellent salary and benefits in a preferred Florida location by sending your resume to

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Director, Software Products Division
APPLIED DATA RESEARCH, INC.
Route 206 and Orchard Road, CN-8
Princeton, New Jersey 08540

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ADR

Data Processing

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To support the continuing growth of our Manufacturing Systems Division, we seek high potential, self-starting individuals to fill the following positions in BOSTON.

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- **MRP Consultant:** 7+ years experience in computer-based manufacturing control systems, including MRP. Consulting background with heavy client contact preferred. Knowledge of manufacturing packages a plus.
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Present Pos./Duties ______________________________
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Software AG of North America, Inc.
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Bellevue, Washington 98004

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Personnel Office
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The Successful Applicant Must Substantiate:

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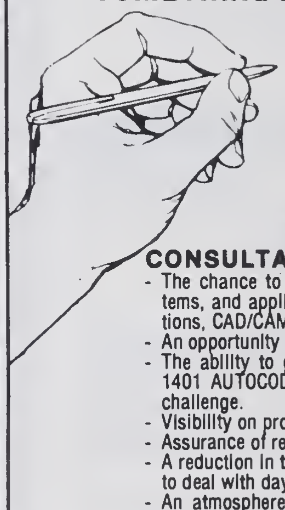

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• • •

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UNITED TECHNOLOGIES ESSEX GROUP

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New Hampshire College

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Graduate School of Business
New Hampshire College
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Manchester,
NH 03104

new hampshire college

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Our on-going expansion has created immediate openings for the following professionals:

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Requires 2-5 years experience primarily in COBOL or FORTRAN. Working knowledge of structured programming concepts desirable. Experience with IBM hardware and software, OS-JCL, CICS and MARK IV would be a definite plus. Degrees in Computer Science, Engineering, Math, Statistics, Accounting or related area preferred. Positions are available in all areas including financial and accounting systems, operations and construction systems, and engineering and scientific applications. Specialized areas include mini-computer systems and microprocessor-based systems.

SYSTEMS PROGRAMMERS:

A degree is preferred with a minimum of 2 years experience in any of the following areas:

- CICS, IMS, shared spool HASP, JES 2, or operating system internals.
- Research and analysis and evaluation of distributed data processing systems.
- Computer performance evaluation and capacity planning with software physics a plus.
- Data communications hardware and software experience. Heavy exposure to problem-solving and networking planning.

Presently, CP&L has an IBM 3031 and 3032, large on-line network and is running on an MVS system.

COMPUTER PROGRAMMERS:

- Position requires a Bachelors Degree in Math, Computer Science or related field and at least 3-5 years in data processing. Knowledge of COBOL, FORTRAN, MARK IV, OS JCL, SAS, VSAM, ROSCOE and experience in instruction are desirable. Should be interested in problem-solving and research.
- Position requires a B.S. degree in Computer Science or equivalent education and experience Must have 2 years actual programming experience and a knowledge of real-time operating systems. Background in FORTRAN and/or Assembly computer languages is desirable

COMPUTER SUPPORT ANALYSTS:

- Position requires a B.S. in Computer Science, Engineering, Applied Math, Science or equivalent. Must have 3 years minimum experience in computer applications, preferably in several different areas. Requires experience on an IBM OS/VS system and on at least one time-sharing system. Experience on VSPC, ROSCOE, TSO desirable.
- Position requires a B.S. degree in Math, in Computer Science or business-related field. Must have at least 5 years in data processing and prior experience in large system development projects and use of standards Among other quality assurance functions, individual will assist in definition/implementation of departmental productivity measurements.

PRODUCTION COORDINATORS:

Understanding of JCL. Programming experience on IBM system. Primary responsibility will be the scheduling and supporting of production work.

To find out more about the career opportunities with CP&L, send resume and salary requirements to Elaine Benson, Recruitment Representative, CAROLINA POWER & LIGHT COMPANY, P.O. Box 1551, Raleigh, North Carolina 27602

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PROGRAMMER

We are seeking a programmer/analyst with a degree in computer science, or related area, with a minimum of 2 years programming experience. Position requirements include substantial skill in program design, programming techniques, programming languages, coding and program testing and application to the solution of problems. Salary range 17K-20.5K. Send resume to:

Tom Maher
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St. Louis, MO 63101

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Texas/National/International

Assistant DP Manager (RPG II) .... **TO $25,000**
A growing South Texas S/3 computer facility is searching for a development oriented Lead Programmer/Analyst. A system 38 is due to arrive in 1981.

Programmer/Analysts (Several) .... **$12 TO 30,000**
RPG II, COBOL, ALC, DBMS, IMS, NEAT, DATABUS, DIBOL, CANDE, MCP, MACRO II, PL/C, PL1, APL, PASCAL. Several locations.

Firmware Support .... **TO $35,000**
Join this small dynamic group and do "state-of-the-art" hardware/software support. Prefer a degree in EE or Computer Science.

Product Marketing .... **TO $50,000**
Join a leader in computerized controlled systems for energy and commercial process automation.

Texas/Mexico .... **TO $40,000**
A major national computer services firm is just now starting to staff projects for Dallas, Mexico. Positions for Senior Programmer Analysts through Project Managers. Heavy emphasis on sophisticated Database Management (i.e., IMS, CICS, ADABAS, IDMS).

Data Center Expansion .... **$12 TO $32,000**
A local corporation is in the process of making a major commitment to development, On-Line, Communications Systems. Positions for Programmer/Analyst, Operators, and Systems Analysts. The commitment is from the "TOP" down in sophisticated IBM environment. The goals are to get the jobs done, not to work on political entanglements.

Computer Center Upgrade .... **TO $38,000**
This Fortune 500 corporation is searching for several self-motivated large scale systems/programming professionals. Career positions for Systems Programmers, Data Base Specialists, and Project Managers. This configuration is 3033, IMS, TSO, On-Line environment.

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Excellent benefits and opportunities.

Send resume to:

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HOUSTON

Data Base Administrator

A major user of IBM mainframes is consolidating its data processing function into a centrally located facility, which will support a nationwide multi-point communications network. The environment will include multiple IBM 3033's operating under MVS & IMS. As a part of this 5-year effort, a corporate data base must be planned, designed & implemented. All current and future application systems will interface with the corporate data base.

The key position for this new plan will be the Data Base Administrator. The ideal candidate will possess 5-10 years of solid IMS experience in a large scale on-line transaction environment. Individual will also possess good communication skills and some prior management experience. Primary responsibilities will include complete staffing of the Data Administration Group and direction of the planning & design phase of the corporate data base (2-year effort). This position offers the right candidate an opportunity to build their own organization, and to direct a 5-year consolidation effort. Significant promotional opportunities will exist in the new organization.

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The University of Minnesota seeks nominations for this chair, newly endowed by the Honeywell Fund. Nominees should have a distinguished record of research and publication in MIS, and an ability to maintain effective communication with the computer industry. Please write or call the search committee chairman, Edward Foster, Associate Dean, College of Business Administration, University of Minnesota, Minneapolis 55455, tel. 612-373-3759, for information. We expect to close the search on February 20, 1981.

The University of Minnesota is an equal opportunity educator and employer and specifically invites and encourages applications from women and minorities.

DATA SYSTEMS DEVELOPMENT MANAGER
SAN DIEGO CITY SCHOOLS
Salary $31,824 to $40,812

Applications are being accepted for the above managerial position. This position is responsible for planning, organizing, directing and coordinating all city school's systems development and programming activities in the Data Processing Department. successful candidate will possess combination of training and experience equivalent to bachelor's degree in information systems, business or public administration or related field; managerial experience in large scale information systems and program development environment.

All interested applicants are encouraged to obtain application forms from, and submit together with a detailed resume prior to January 20, 1981, to:

Personnel Administration
4100 Normal Street, Room 1241
San Diego, California 92103
Phone No. (714) 293-8541

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CORPORATE RECRUITERS NATIONWIDE LISTINGS

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DATA BASE	TO
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Systems Analyst(s) CICS MFG/Financial	$24K
Programmer/Analyst(s) IMS/VS	$24K
Programmer/Analyst(s) COBOL/ALC	$22K
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TECHNICAL SUPPORT	**TO**
Sr. Systems Prog(s) MVS-SYSGENS	$30K
Systems Prog(s) OS:SVS-MVT SYSGENS	$26K
Systems Prog(s) OS/DOS: ALC,CICS	$18-24K

CONTACT BILL DENNY, V.P.

Jim King and Associates

1840 Gulf Life Tower/Jacksonville, Florida 32207
(904) 398-7371

DATA PROCESSING

SENIOR SYSTEMS SOFTWARE SPECIALIST

The California State University and Colleges is seeking a Senior Technical Specialist in the area of operating systems support with at least five years of experience in data processing. This person's primary responsibility will be the supervision of the operating systems Special Projects Group on the newly procurred Control Data Corporation CYBER Series Computing System. Knowledge of and ability in programming, maintenance, debugging, and enhancement development.

The successful candidate will have a strong background in operating system support on large computer systems. Supervisory or project management experience is required and experience with the MSO operating system would be an added plus. Equivalent to graduation from a four year college.

Salary $30,516 — $36,864. Final filing date: February 9, 1981.

For immediate consideration, call Gary Adams at (213) 852-5764 or send resume to:

Personnel Services, Ref: #28
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University & Colleges
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THE POSITION: Added manufacturing capacity has created the need in the M.I.S. Group for a Project Leader knowledgeable in manufacturing systems. Individual selected will head up all systems analysis and design for the upgrading of production and inventory control systems.

QUALIFICATIONS: Exposure to MRP systems, shop floor control, Inventory real-time transactions or engineering control changes would be assets. Ability to set and meet your schedules, communicate at multiple levels and to train staff and user groups are necessary.

For prompt and confidential consideration, forward your resume or call David Pepin Collect.

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DATA BASE ADMIN. - 6-8 yrs. exp., 3 yr. IMS	To $38K
SYSTEMS PROGRAMMER - BAL, OS Internals	To $35K
S/W DEVELOPMENT - Process Control, degree	To $33K
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Please call or send your resume to Emil Pieper.

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Director of Data Processing and Business Services

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Fundamental to the position is a comprehensive knowledge of EDP function with prior experience in the evaluation, selection, implementation and management of data processing systems. This is a demanding executive level position reporting directly to the chief operating officer. Competitive salary, commensurate with proven ability combined with attractive fringe benefit package. Please submit resume, in strict confidence, with salary history to:

Kathleen LaBernz
University Health Center, Inc.
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Rapidly expanding insurance consulting and administration firm seeks a person to help support one of the largest data base environments in the intermountain west. Duties include all phases of data base support. Must have strong systems background in BURROUGHS large systems, COBOL, ALGOL, MCP and the use of DSMII in user programs. A knowledge of DASDL, DMALGOL and DMSII software internals is desirable. Send resume, salary history and requirements to:

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Requires:
1) Minimum B.S. degree an absolute must — M.B.A. preferred.
2) Four to five years S & P experience.
3) IBM OS required.
4) TSO, PL/1 are pluses
5) Must show future potential through strong past advancement.
6) Must show employment stability.
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8) Must be able to get along well with staff.

For confidential exploratory interview call **Ken Lavinson, 9 a.m.-4:30 p.m., 305/-757-6800 or 7 p.m.-10 p.m., 305/949-5142** or submit resume to me at **7300 Biscayne Blvd., Ste. 444, Miami, FL 33138.**

AGENCY RESPONSE WELCOME

GRAPHICS

Michigan Technological University seeks Senior Systems Programmers and Senior Programmer/Analysts to assist with the installation and development of the University Computer Graphics Laboratory. The Graphics Lab is centered around a dedicated IBM 4341 with seven IBM 3251 compatible refresh terminals, four storage tubes, and linked to a Univac 1100/80.

The software consists of CADAM (Lockheed) operating under VM/CMS and OS/VS1.

Michigan Technological University is 9th in the nation in undergrad engineering enrollments and is located in a small town, four-season recreation area.

Senior Level applicants who can accept state of the art challenges should send a resume' to **Vance Nelson, Director of Computer Services, Michigan Technological University, Houghton, Michigan 49931.**

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DAYTONA BEACH SR. PROGRAMMER/ ANALYST

Assignments will include development of new on-line financial management and accounting applications. Applicants must have a minimum of 4 years experience using RPG II and COBOL in a communications environment. Associates Degree in Computer Science is required, a Bachelor's Degree in Information Systems is preferred. Send resume and salary requirements to **Mr. Chris Price, Information Systems Manager, City of Daytona Beach, P.O. Box 551, Daytona Beach, FL 32015.**

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Rank/Salary: Rank and starting salary contingent upon experience and qualifications. Nine-month fixed term appointement. Mail resume to: John H. Smith, Assistant to the President, Oregon Institute of Technology, Oretech Branch Post Office, Klamoth Falls, OR 97601. (503) 882-6321, ext 282.

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Director Information Systems

The California State University and Colleges has an executive position whose charge is to plan, direct, and implement the information processing objectives and policies of a 19 campus educational system with state-of-the-art hardware. Position reports to the Vice Chancellor, Business Affairs and is responsible for an organization of 125 employees. The incumbent will represent central administration to campus constituencies and officials in other state agencies on academic and administrative computing support. Moderate travel required.

Qualifications:

Comprehensive knowledge of management functions, DP, computer technology, and MIS; demonstrated management planning and development ability; leadership qualities evident in coordinating and communicating with others. Five years of progressively responsible top management information systems experience which demonstrates management ability of a complex multi-user information system. Equivalent to graduation from a four-year college. Advanced degree desirable. Salary: **$43,716 - $52,908.**
Final filing date: **February 6, 1981.**
Send resume to:

Personnel Services Ref: #22
Office of the Chancellor
THE CALIFORNIA STATE
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400 Golden Shore
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SYSTEMS PROGRAMMER

FLORIDA

Red Lobster Inns of America, the nation's foremost seafood restaurant chain has an immediate opening for a talented professional in our Orlando corporate office. Our environment consists of dual IBM 4341 processors operating under VM and OS/VSI utilizing a CMS time sharing network.

The successful candidate for this challenging position will be a self-motivated individual with a background in VM/370 and OS/VSI, and will have at least 3 years systems programming experience.

We offer excellent salary and benefits including profit sharing and retirement plan, medical and dental insurance, paid relocation, and an opportunity for continued career development.

If you qualify, send your resume with salary history to Department JSC/CW, Red Lobster Inns of America, P.O. Box 13330, Orlando, Florida 32859.

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Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (213) 450-7181

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William J. Mills,
Manager
Classified Advertising

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Minimum 2 years operating experience in IBM hardware operating under MVS, TSO, CICS and VTAM.

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2 years minimum data base experience (IDMS), data base software support experience, and strong COBOL debugging ability. Experience in schemas and subschemas preferred.

CICS SYSTEMS PROGRAMMER

Minimum 3 years experience with CICS/IDMS or CICS/DL1 internals, strong BAL and a good working knowledge of COBOL, VTAM or TCAM.

PROGRAMMER ANALYSTS/ PROJECT LEADERS

Minimum 2-5 years COBOL, CICS and IDMS applications and design experience needed.

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DIRECTOR OF ACADEMIC COMPUTING SERVICES

University of Kansas
Lawrence, Kansas

The University of Kansas is seeking a Director for Academic Computing Services on the Lawrence campus. The Director reports to the office of the Exceutive Vice Chancellor and is responsible for the planning, development and management of the Center, and for coordination of academic computing services on campus. The goal is to provide computer resources and services which support the varied teaching and research needs of the faculty, staff and students.

Successful managerial experience in a computing environment, demonstrated ability to interact effectively with diverse groups, knowledge of computer hardware and software, including central mainframe computer system, networking, network services, and mini and micro computer systems, an advanced degree; and capabilities to secure funding by outside contracts and grants. Qualification for faculty appointment desirable. Minimum salary is $38,000. Starting date is negotiable but July 1, 1981 is preferred.

A candidate should send a letter of application and resume with the names, addresses and telephone numbers of at least three references to: **Dr. G.P. Willhite, Academic Computing Search Committee, c/o Executive Vice Chancellor. University of Kansas, 231 Strong Hall, Lawrence, Kansas 66045.**

All materials must be received by February 15, 1981

The University of Kansas is an Equal Opportunity Affirmative Action Employer.

City of Miami Beach

MIS/DP MANAGER

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The Joint Center for Graduate Study, at Richland, Washington, is an educational Center, administered jointly by the University of Washington and Washington State University, with program participation by Oregon State University. The Center is seeking a resident faculty member to coordinate the graduate program in computer science, sponsored by Washington State University, and to serve as director of the computer facility and service. Candidates must hold a PhD degree in computer science or related field and have a broad interest in developing collaborative educational and research programs with the sponsoring Universities and with the Hanford Laboratories, particularly encore areas such as data bases, software engineering and hardware/software specialties. Academic and industrial experience in research, teaching and administration are desirable.

The Joint Center for Graduate Study has sole use of a PRIME 750 virtual memory computer and access to the computer center located on campus at Washington State University in Pullman, Washington. The appointment level for the position will depend upon the qualifications of the applicant. Applications including 3 letters of reference and current **curriculum vitae** should be addressed: **Chairman, Computer Science Screening Committee, Joint Center for Graduate Study, 100 Sprout Road, Richland, WA 99352. Deadline for applications is March 15, 1981.** An equal opportunity/affirmative action employer.

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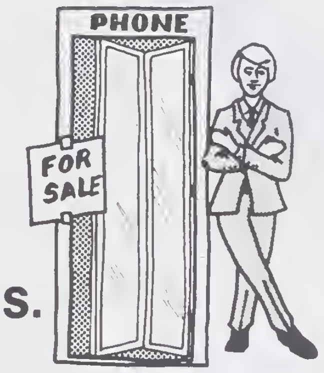

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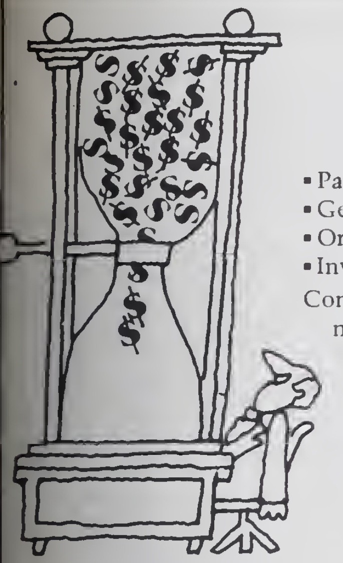

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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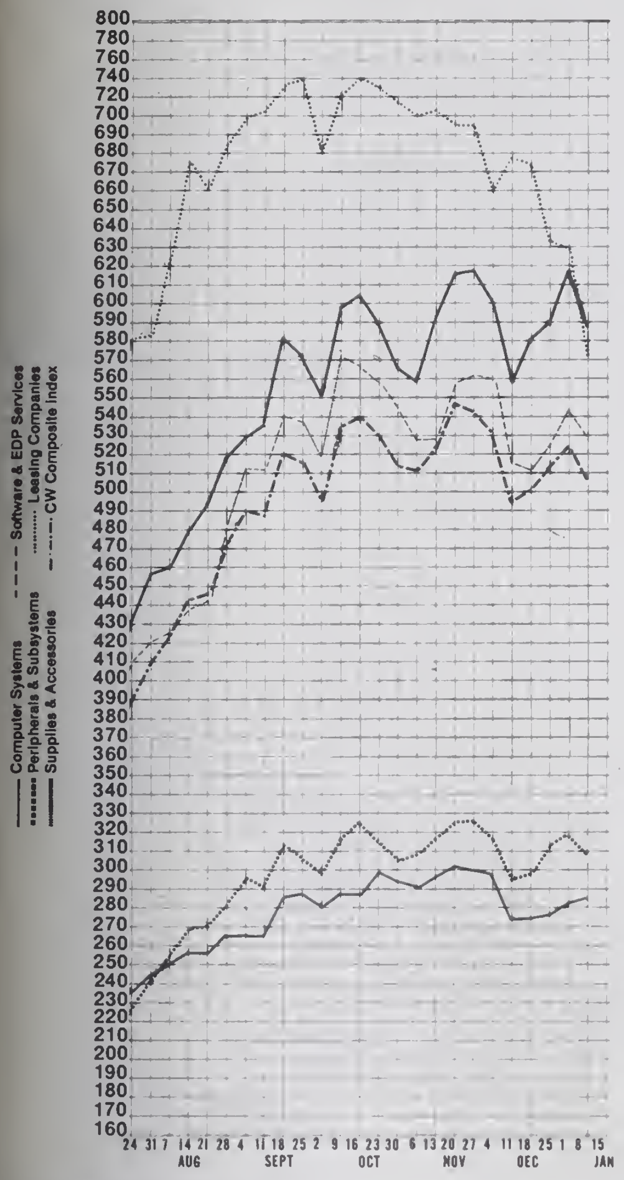
Computerworld Stock Trading Index



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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 7, 1981

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1980-81 RANGE (1)	PRICE CLOSE JAN 7 1981	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
A	AMDAHL CORP	15- 42	32 1/2	-1 1/4	-3.7
N	BURROUGHS CORP	47- 88	53 3/4	- 1/8	-0.2
O	COMPUTER AUTOMATION	9- 27	18 1/2	- 1/4	-1.3
N	CONTROL DATA CORP	35- 77	69 1/8	-1 3/8	-1.9
O	CRAY RESEARCH INC	10- 49	39 1/8	-9 3/8	-19.3
N	DATA GENERAL CORP	46- 87	61 1/4	-4 5/8	-7.0
N	DATAPOINT CORP	44-119	115	-4 1/4	-3.5
N	DIGITAL EQUIPMENT	52- 98	90 7/8	-4 1/8	-4.3
A	EECO INC	6- 17	15 1/2	-1 1/8	-6.7
N	ELECTRONIC ASSOC.	6- 12	7 1/4	- 5/8	-7.9
N	FOUR-PHASE SYSTEMS	20- 49	24 1/2	-1 3/4	-6.6
N	FOXBORO	31- 59	56	-2 5/8	-4.4
O	GENERAL AUTOMATION	7- 19	9 1/2	- 7/8	-8.4
O	GRI COMPUTER CORP	1- 3	1 1/8	- 1/4	-18.1
N	HEWLETT-PACKARD CO	46- 95	88 1/4	-1 1/4	-1.3
N	HONEYWELL INC	65-115	106 5/8	-5 1/8	-4.5
N	IBM	50- 79	69 1/2	+1 5/8	+2.3
O	MAGNUSON COMP SYSTS	20- 46	41 1/4	-3 3/4	-8.3
N	MANAGEMENT ASSIST	9- 25	15 3/4	+1 1/4	+8.6
O	MANUFACTURING DATA S	22- 80	66 3/4	-4 1/4	-5.9
O	MINI-COMPUTER SYST	2- 6	2	+ 1/8	+6.6
O	MODULAR COMPUTER SYS	9- 31	22 1/2	-1 3/8	-5.7
N	NCR	52- 82	72 1/4	-2 3/4	-3.6
N	PRIME COMPUTER INC	10- 41	36	-5 1/4	-12.7
N	PERKIN-ELMER	13- 35	33 3/4	-1	-2.8
N	SPERRY CORP	42- 65	63 1/8	- 1/4	-0.3
O	TANDEM COMPUTERS INC	13- 76	70	-6	-7.8
N	TEXAS INSTRUMENTS	79-150	121 3/4	+1	+0.8
A	WANG LABS.	17- 60	35 5/8	-4 1/2	-11.2

LEASING COMPANIES

EXCH		PRICE 1980-81 RANGE (1)	PRICE CLOSE JAN 7 1981	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
O	BOOTHE FINANCIAL CP	13- 27	20 1/4	- 3/4	-3.5
N	COMDISCO INC	6- 24	20 5/8	-1 3/4	-7.8
A	COMMERCE GROUP CORP	1- 2	1/2	- 1/8	-20.0
A	COMPUTER INVSTRS GRP	0- 4	1/4	0	0.0
O	CONTINENTAL INFO SYS	2- 15	3 3/4	- 1/4	-6.2
M	DATRONIC RENTAL	3- 5	4 1/2	0	0.0
A	DCL INC	3- 6	2 5/8	- 1/8	-4.5
N	DPF INC	5- 12	6	- 3/8	-5.8
O	ITEL	1- 15	3/8	- 1/2	-57.1
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 1/2	0	0.0
N	RELIANCE GROUP INC	24- 79	68 3/4	-4 1/4	-5.8
N	U.S. LEASING	12- 27	25 1/2	-1 1/2	-5.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1980-81 RANGE (1)	PRICE CLOSE JAN 7, 1981	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	4 3/8	- 1/2	-10.2
O	ADVANCED SYSTEMS INC	12- 15	13	- 7/8	-6.8
O	ANACOMP INC	7- 24	18 1/8	-1 5/8	-8.2
O	ANALYSTS INTL CORP	3- 14	10	-1	-9.0
A	APPLIED DATA RES.	6- 24	17 1/8	-2 7/8	-14.3
N	AUTOMATIC DATA PROC	31- 52	49 3/8	- 1/8	-0.2
O	CGA COMPUTER ASSOC	9- 17	13 3/4	-1 3/4	-11.2
O	COMPUTER HORIZONS	1- 5	3	+ 7/8	+41.1
O	COMPUTER NETWORK	4- 9	6 1/2	+ 3/8	+6.1
N	COMPUTER SCIENCES	11- 30	18 1/2	- 1/2	-2.6
O	COMPUTER TASK GROUP	1- 23	20	- 1/2	-2.4
O	COMPUTER USAGE	2- 10	8	+ 1/2	+6.6
O	COMPUT AUTO REP SVC	4- 11	7 5/8	- 1/8	-1.6
O	COMSHARE	11- 21	16 1/4	+1 1/4	+8.3
O	CULLINANE DATABASE	18- 65	35	0	0.0
O	DATA DIMENSIONS INC	1- 6	1 1/4	- 1/8	-9.0
O	DATATAB	1- 4	1 1/8	0	0.0
O	DSI CORP	4- 9	6 3/4	- 1/2	-6.8
N	ELECTRONIC DATA SYST	19- 37	35	+2 3/8	+7.2
O	INFORMATICS INC	9- 25	23	-1 1/2	-6.1
O	INSYTE CORP	1- 3	2 3/8	- 1/8	-5.0
O	IPS COMPUTER MARKET.	1- 4	1	- 1/4	-20.0
O	KEANE ASSOCIATES	3- 9	5 3/4	- 1/4	-4.1
O	KEYDATA CORP	1- 5	5/8	-	-8.2
A	LOGICON	12- 30	25 7/8	- 5/8	-2.3
O	MATHEMATICA INC	5- 18	16	+ 1/2	+3.2
O	MATHEMATICAL APP GRP	7- 33	17	-1 1/2	-8.1
O	NATIONAL DATA CORP	10- 35	33 5/8	-1	-2.8
N	PLANNING RESEARCH	5- 13	7 5/8	- 1/2	-6.1
O	PROGRAMMING & SYS	1- 1	3/4	-	-7.0
O	RAPIDATA INC	4- 11	9 3/8	- 1/8	-1.3
O	REYNOLDS & REYNOLD	20- 34	23 1/4	+2 3/4	+13.4
O	STSC INC	6- 28	25 3/4	- 1/2	-1.9
O	SCIENTIFIC COMPUTERS	6- 34	29	0	0.0
N	TYMSHARE INC	17- 50	44 3/4	-3 7/8	-7.9
A	URS CORP	5- 17	14	- 3/8	-2.6
N	WYLY CORP	4- 20	14 3/4	-1 5/8	-9.9

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1980-81 RANGE (1)	PRICE CLOSE JAN 7, 1981	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	AM INTERNATIONAL	13- 24	13 1/2	-2	-12.9
N	AMPEX CORP	14- 38	34 5/8	-1 5/8	-4.4
A	ANDERSON JACOBSON	9- 25	20 3/8	-2 1/8	-9.4
O	AUTO-TROL TECHNOLOGY	18- 62	43	-1	-2.2
O	BEEHIVE INT'L	3- 36	28 1/2	-7	-19.7
A	BOLT,BERANEK & NEW	12- 37	32 1/2	-2 3/8	-6.8
N	BUNKER RAMO	17- 41	37 1/8	-2 5/8	-6.6
O	CAMBRIDGE MEMORIES	1- 9	2 3/4	- 1/4	-8.3
N	CENTRONICS DATA COMP	19- 55	22	- 1/4	-1.1
A	CETEC CORP	3- 8	6 7/8	+ 1/4	+3.7
O	COMPUTER DEVICES INC	5- 10	8 5/8	- 3/8	-4.1
O	COGNITRONICS	1- 10	8 7/8	- 3/4	-7.7
O	COMPUTER COMMUN.	4- 10	2	0	0.0
O	COMPUTER CONSOLES	4- 29	22 3/4	- 1/4	-1.0
O	COMPUTER TRANSCEIVER	1- 6	5 3/8	- 3/8	-6.5
N	COMPUTERVISION CORP	24- 92	75 1/2	-5	-6.2
N	CONRAC CORP	13- 25	17 3/4	- 1/2	-2.7
A	DATA ACCESS SYSTEMS	6- 23	20 1/4	-3	-12.9
A	DATAPRODUCTS CORP	11- 38	35	-1 7/8	-5.0
O	DATUM INC	2- 5	3 1/2	- 1/8	-3.4
O	DECISION DATA COMPUT	2- 6	5	+ 1/4	+5.2
O	DELTA DATA SYSTEMS	1- 3	1 1/2	- 1/8	-7.6
O	DATARAM CORP	6- 37	10 1/2	0	0.0
N	ELECTRONIC M & M	3- 9	7 1/4	- 1/4	-3.3
O	EVANS & SUTHERLAND	21- 83	66 1/2	-2 1/2	-3.6
O	FABRI-TEK	1- 4	2 7/8	0	0.0
O	GENERAL COMPUTER SYS	1- 8	7	- 1/2	-6.6
O	GEN'L DATA COMM IND	8- 22	17 1/2	+ 1/2	+2.9
O	GENERAL TERMINAL CP	1- 4	1 3/4	+ 1/4	+16.6
N	HAZELTINE CORP	12- 33	25 3/4	-2	-7.2
N	HARRIS CORP	25- 55	50 1/2	-1 5/8	-3.1
O	INFORMATION INTL INC	8- 15	11	+ 3/4	+7.3
O	INTEL CORP	23- 50	39 1/2	- 3/4	-1.8
O	INTERSIL	13- 34	33 1/4	- 3/4	-2.2
A	LUNDY ELECTRONICS	4- 17	12	0	0.0
O	MSI DATA CORP	5- 16	13 1/8	+ 3/4	+6.0
N	MEMOREX	10- 34	13	+ 1/4	+1.9
N	MOHAWK DATA SCI	10- 31	21 7/8	-2 1/2	-10.2
O	OMEX	2- 12	10	-1	-9.0
A	PARADYNE CORP	9- 34	30 1/8	-1 1/8	-3.5
A	PENRIL CORP	9- 16	14 1/8	- 1/4	-1.7
O	RAMTEK CORP	10- 23	20	-2 1/4	-10.1
O	RECOGNITION EQUIP	5- 21	15 5/8	+ 1/4	+1.6
O	SCAN DATA	1- 5	1 1/2	0	0.0
N	STORAGE TECHNOLOGY	12- 26	20 3/4	-1 7/8	-8.2
O	SYKES DATATRONICS	14- 50	32 1/2	-6	-15.5
O	T BAR INC	14- 24	18	-3	-14.2
A	TEC INC	3- 9	5 1/4	+1 1/4	+31.2
N	TEKTRONIX INC	42- 70	59 1/2	-1 5/8	-2.6
N	TELEX	3- 6	5 1/8	+ 1/4	+5.1
O	TESDATA SYSTEMS CP	8- 26	11	-1 1/2	-12.0
A	TIMEPLEX INC	5- 22	16 3/4	-1 5/8	-8.8
O	WILTEK INC	1- 3	3	+ 1/8	+4.3

SUPPLIES & ACCESSORIES

EXCH		PRICE 1980-81 RANGE (1)	PRICE CLOSE JAN 7· 1981	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
A	AMERICAN BUS PRODS	8- 15	13 5/8	- 7/8	-6.0
O	BALTIMORE BUS FORMS	1- 2	1/2	0	0.0
N	BARRY WRIGHT	8- 22	18 7/8	-1	-5.0
O	CYBERMATICS INC	1- 2	1 1/8	+ 1/4	+28.5
A	DUPLEX PRODUCTS INC	11- 16	13 1/2	+ 1/8	+0.9
N	ENNIS BUS. FORMS	13- 21	16	+ 1/2	+3.2
N	3M COMPANY	46- 63	62 5/8	+3 5/8	+6.1
O	MOORE CORP LTD	27- 37	34 1/2	+ 1/4	+0.7
N	NASHUA CORP	20- 35	23 1/8	-1	-4.1
O	STANDARD REGISTER	22- 35	33 3/4	+1 1/4	+3.8
A	TAB PRODUCTS CO	9- 30	20 3/8	-1 5/8	-7.3
N	WABASH MAGNETICS	11- 31	30 1/4	0	0.0
N	WALLACE BUS FORMS	12- 26	23 3/4	-1	-4.0

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